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For the American Academy
of Arts & Sciences at Boston,
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With a letter on the use of
Salt in Agriculture.

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THOUGHTS

ON

The Laws relating to Salt;

WITH ARGUMENTS FOR THE REPEAL OF THOSE LAWS, COLLECTED FROM A VARIETY OF SOURCES; AND ARRANGED UNDER DISTINCT HEADS.

TO WHICH IS PREFIXED,

THE AUTHOR'S EVIDENCE

GIVEN TO THE HONOURABLE THE BOARD OF TRADE, ON THE 8TH AND 11TH OF APRIL, 1817, ON THE SAME SUBJECT.

BY

SAMUEL PARKES, F.L.S. M.R.I.

AND MEMBER OF THE GEOLOGICAL SOCIETY;

Author of The Chemical Essays, The Chemical Catechism, and The Rudiments of Chemistry.

LONDON:

PRINTED FOR THE AUTHOR,

PUBLISHED BY BALDWIN, CRADOCK, AND JOY;

AND SOLD BY ALL OTHER BOOKSELLERS.

1817.

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" At cui lactis amor, cytisum, lotosque frequentes
Ipse manu, salsasque ferat præsepibus herbas.
Hinc et amant fluvios magis, et magis ubera tendunt,
Et salis occultum referunt in lacte saporem."

VIRG. GEORG. lib. iii. ver. 394.

Printed by R. and A. Taylor, Shoe Lane, London.

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TO

THE RIGHT HONOURABLE

NICHOLAS VANSITTART,

CHANCELLOR OF THE EXCHEQUER,

AND ONE OF HIS MAJESTY'S MOST HONOURABLE

PRIVY COUNCIL,

THIS COLLECTION OF FACTS,

RESPECTING

AN IMPORTANT SUBJECT OF

POLITICAL ECONOMY,

IS VERY RESPECTFULLY INSCRIBED

BY

THE AUTHOR.

London, 22d April, 1817.

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PREFACE.

MURIATIC Acid and Mineral Alkali are two very important substances in a manufacturing country. It would be difficult to find any articles having so near a relation to each other, which are in such universal and extensive demand. These substances, when in a state of chemical union, form our common table salt. By various chemical means the acid and the alkali may, however, be separated from each other, and then they become distinct articles of commerce, suited for a variety of different purposes in the arts.

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The muriatic acid, or spirit of salt, which is consumed in these kingdoms is thus procured from common salt; but the mineral alkali is obtained from other sources. The high duty of 30*l.* per ton on salt has rendered that commodity too dear to be employed in furnishing mineral alkali: we are therefore under the necessity of looking either to barilla or natron (both articles of foreign produce) for the greatest part of the mineral alkali and crystallized soda which this country requires.

For this and other important reasons I have many years been accustomed to consider the salt-duty as very impolitic and oppressive. Impolitic—in as much as it deprives us of the advantage which our immense mines of rock-salt would otherwise afford us for improving our manufactures;

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for excelling in agriculture; for extending our fisheries, and with them our nursery for seamen; and for becoming a provision-mart for the greatest part of the civilized world. Oppressive—because in many cases it prevents the manufacturer from operating in his own way, and thus making the best of his materials; because it prohibits the farmer from fertilizing his lands even with the scalings of the salt-pans, or with the waste salt which is unfit for any culinary or manufacturing purpose; and because it prevents the poor man who resides upon the sea-coast from availing himself of his local advantages, and maintaining his family comfortably and independently, by catching and curing fish.

Considering this subject to be of the utmost national importance, I availed myself

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of the opportunity which was afforded me, while writing my late Chemical Essays, of offering a few occasional remarks to the notice of my readers; in the hope that some nobleman or gentleman of sufficient influence and authority would take up the subject, and bring it in a proper way before Parliament. I was therefore much gratified upon being lately informed by a worthy and patriotic baronet, that my observations had made the desired impression upon him; that he perceived how necessary it was for the welfare of the country that the salt-laws should be repealed; that he had determined to take the necessary means for calling the attention of His Majesty's Ministers to the subject; and that he and the friends whom he had interested in the cause, would omit no effort which would be likely to promote and attain the desired object.

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In consequence of this, several meetings have been convened for the purpose of conferring upon the measure; and at one of these, held on the 8th of April 1817, at the Honourable the Board of Trade, in which the Right Honourable Frederick Robinson, M. P. Vice President of the Board, and one of the Lords of His Majesty's most Honourable Privy Council, presided, the following evidence was given; which afforded matter for conversation and further inquiry.

A short time afterwards some of the most zealous friends to the repeal of the salt-duties requested that I would attend once more at the Board of Trade, to give some further evidence respecting a few particular points on which it was deemed desirable to afford the Members of Admini-

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stration a more decided opinion. I therefore attended accordingly, and answered the several questions which were put to me, in the manner which is detailed at page 58 of the following sheets.

These examinations, together with several private meetings at which I had previously assisted, all tended to confirm my opinion, that it would be difficult to devise any measure of political economy, better calculated to relieve the distresses of the country, or to promote the lasting prosperity of the nation, than the total repeal of all the existing laws relating to salt. And knowing that few persons had devoted so much attention to the subject in all its variety of bearings as myself, it occurred to me that I could not render a more useful or acceptable service to my country, than

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to collect the various arguments which have at different times been adduced in favour of this important measure; or, at least, so much of that kind of matter as the short interval between my last examination and the meeting of Parliament would allow me.

The very interesting pamphlets which were lately published by Sir Thomas Bernard, bart. and William Horne, esq. of Liverpool, the only two printed treatises which I have seen on the subject, contain a great number of striking and important facts, well calculated to awaken and inform the public mind, and to direct it to the consideration of the important measure now under contemplation:—but, having conceived that great benefit might be derived from a work in which the several ar-

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guments should be arranged under separate and distinct heads, I resolved to attempt the task, and now submit the result to the candid consideration of an impartial public.

The Tables which are printed at the end of the volume will be found to contain much useful information: and I am desirous of assuring my readers, that I have procured those interesting documents from such sources that I can have no doubt whatever of their authenticity.

I have now only to add, that I expect to derive no personal profit nor any emolument whatever from the repeal of the laws relating to salt; but that I have taken this enlarged view of the question, with what I conceive to be a laudable am-

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bition, to effect a most important measure; and in the hope of having ere long the prospect of enjoying that inward satisfaction which must necessarily result from the consciousness of having been one of the humble instruments of conferring upon my country the greatest boon which it will have received from its Government during a long and eventful reign.

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MINUTES OF EVIDENCE

READ BEFORE THE BOARD OF TRADE

ON

THE PROPOSED REPEAL

OF THE

DUTIES UPON SALT.

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Tuesday, April 8th, 1817.

Mr. SAMUEL PARKES called, and examined by the Board.

PREVIOUS to the examination certain questions were transmitted to Mr. Parkes for his consideration, of which the following is a copy.

Question 1st. What is your situation or profession?

2dly. What are the articles of our present manufactures in which salt is used?

3dly. What *new* manufactures from salt or otherwise, do you think would be established in this country, and how far would the present manufactures be increased and improved, by the repeal of the salt-duties?

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4thly. How far, in your opinion, would the supply of these new articles made from salt *duty free*, benefit our other manufactures, and increase our articles of export; particularly as to mineral alkali and oxy-muriatic acid?

5thly. Do you know any thing as to the use of salt as a manure, or for hay or cattle?

6thly. How far, in your opinion, and how soon, would the repeal of the salt-duties augment the demand for labour, and increase the manufactures, fisheries, trade, commerce, produce, and prosperity of the country?

In answer to the FIRST QUESTION, Mr. Parkes stated, that his profession is that of a manufacturing chemist, but that he had devoted much time to the study of chemistry as applicable to the trade and manufactures of the kingdom.

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In reply to the other questions, Mr. Parkes delivered in a written paper, which was immediately read to the Board by the Right Honourable Frederic Robinson, M.P. Vice-President of the Board of Trade, and one of the Lords of His Majesty's most Honourable Privy Council, of which the following is a copy.

In reply to the SECOND QUESTION, the annexed list of some of the principal articles into which common salt enters as a necessary ingredient, either in its original and compound state, or when decomposed and separated into muriatic acid and soda, is respectfully submitted:

1. SAL AMMONIAC or MURIATE of AMMONIA.—Twenty or thirty years ago, the manufacture of this important article formed a considerable trade in England; but when Mr. Pitt imposed the first additional ten pounds per ton on salt, the largest manu-

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facturer in Great Britain, a Mr. Minish of Whitechapel Road, immediately relinquished the business; and when the duty on salt was raised to 30*l.* per ton, nearly every English maker of sal ammoniac abandoned the manufacture, because, owing to the increased expense of the salt, which it was necessary to use in the manufacture of sal ammoniac, the foreign sal ammoniac could be sold some pounds per cwt. cheaper than it was possible to afford that which was of English production. Owing to these causes Great Britain was for many years almost entirely supplied with sal ammoniac from abroad, until it was discovered that the Excise in Scotland would allow of the free use of the bittern from their salt-works (an indulgence not allowed in England), and since then the British market has been supplied jointly with foreign and Scotch sal ammoniac.—The price of sal ammoniac, which has been much reduced by the Scotch manufacturers, is now about 120*l.* per ton: its uses are

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various, and the consumption in Birmingham and Sheffield alone, by the workers in metals, is very considerable. The necessity of common salt for the preparation of sal ammoniac will be apparent from the circumstance of its containing 51 per cent. of muriatic acid. As the other materials for the manufacture of this important salt are extremely cheap; it does appear to me that if the duty were taken off common salt, sal ammoniac would be made in such quantities in Great Britain as to become a very considerable article of exportation.

2. Common salt is a necessary ingredient in the manufacture of HARD SOAP.—In those districts where soap is generally made from wood-ashes, and also whenever Russian or American potash is the alkali employed, large quantities of salt are necessarily used, or the soap would have no consistence. But at Hull and in Liverpool, where kelp is chiefly had recourse to for the manufacture of soap, it is not necessary

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to buy salt, because a sufficient quantity is generally found in the kelp. This is often the case also with barilla: but when the barilla is of fine quality, common salt must be added to the soap; for, however strong the lyes may be, if they do not contain a large portion of common salt, they will be unfit for making hard soap.

3. Common salt is employed largely for the manufacture of GLASS.—Formerly barilla was employed for all kinds of glass; but of late years the use of barilla has been almost entirely discontinued, potash being now chiefly employed for flint glass; the soda which is procured from common salt, for plate glass; and either kelp or a mixture of kelp and common salt, for crown or best window glass. One of the largest makers of window glass in Bristol assured me, only three months ago, that the alkaline substance which was used in their manufactory was almost entirely common salt. For all kinds of glass, salt may now be had

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duty free, and yet few comparatively of the manufacturers avail themselves of the privilege. In some cases this may be owing to the inconveniences which are known always to result from the interference of the Excise, and in others to the want of a sufficient degree of knowledge to enable the proprietors of glass establishments to employ the salt in a proper manner.

4. Common salt is a necessary ingredient in the preparation of the OXY-MURIATE OF LIME and other oxy-muriatic salts which are employed in bleaching.

These important articles consume a very large quantity of common salt, and the Legislature has allowed it to be employed for these purposes without paying duty. Notwithstanding this, there are a great number of calico-printers and bleachers who prefer the buying of these articles ready made, to the inconvenience of coming under the direction and superintendance of the Excise.

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5. A large quantity of common salt is consumed by the manufacturing chemist for the production of SPIRITS OF SALT, or MURIATIC ACID. My own annual consumption of salt for this purpose is from eighteen to twenty tons; and I conceive there are some hundreds of persons in the United Kingdom who purchase common salt for the same purpose. Although I have connexions in most of the manufacturing districts of Great Britain, I have never been able to sell much muriatic acid either in the North of England or in Scotland, owing to the Scotch manufacturers being enabled to get their salt at one eighth or one tenth of the price at which I can obtain it. When I was at Glasgow, in the autumn of the year 1815, a manufacturing chemist showed me a cask of good useful salt, upwards of a hundred weight, which cost him only four shillings. It was, he said, brought to him in such sized casks whenever he wanted it. Muriatic acid is employed in a great variety of pro-

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cesses of dyeing and calico-printing, and the consumption, when our manufactories are in full play, is very considerable.

6. Another article of exportation, as well as of home consumption, which depends upon common salt for its production, is that of GLAUBER'S SALT. This article of trade is generally made from the caput mortuum, or residuum, which remains in the stills after the distillation of muriatic acid, or from the residuum of bleaching salts. And here I am desirous of correcting an error which occurs in Sir Thomas Bernard's very interesting Letter to Mr. Vansittart, at page 30, when speaking of one of these residuums; and this I am the more anxious to do, because Sir Thomas has copied the passage from one of the volumes of my own Chemical Essays. The paragraph runs thus: "In preparing oxy-muriatic acid there is a considerable residuuum which had been thrown away. To prevent this waste, a gentleman in Lan-

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Cashire constructed a large apparatus, consisting of boilers and crystallizing vessels, and succeeded in producing from this residuum many tons of very fine Glauber's salt, on which he paid to the revenue the duty of 30*l.* per ton. Government, however, says Mr. Parkes, from whom I transcribe the fact, has forbidden the sale of the residuum, and consequently this extensive apparatus has become useless."

On this passage it is necessary to observe, that since the Essay was written, from which Sir Thomas Bernard made this extract, the Board of Excise has allowed the free use of all chemical residuums for the production of Glauber's salt, and that owing to the extensive frauds which were committed against the revenue by the Glauber salt makers, Government has thought fit to remit the duty of 30*l.* per ton altogether.

7. Epsom Salt is another commodity which has hitherto been produced entirely

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from salt, or the evaporation of sea water, and it is an article of very extensive consumption in these kingdoms. When it is considered that four or five tons of Epsom salt may generally be procured by the evaporation of that portion of brine which will yield 100 tons of common salt, it will be perceived that the increase in the manufacture of common salt which is contemplated by the repeal of the salt-duties would increase the facilities for procuring Epsom salt. There is, however, some danger of the salt-proprietors losing this branch of their trade, as an ingenious chemist of Manchester (Dr. Henry) has lately discovered a method of preparing Epsom salt from magnesian limestone, which has already had the effect of lowering the price of that useful salt to less than one half of its accustomed price. But, if we should ever obtain the free and unrestrained use of sea-water, it is probable that the trade for Epsom salt may again flow in its usual channel.

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8. MAGNESIA is also an article of commerce which is obtained from salt-brine or from sea-water; and though it has hitherto been collected only from those sources, there is a danger, if the duties should be continued on common salt, that the present proprietors of our salt-works would very soon lose this article of trade as well as that of Epsom salt, as magnesia may also be obtained from magnesian limestone by Dr. Henry's process.

9. CRYSTALLIZED SODA is another article which is obtained from common salt. This is a commodity of such universal demand in the arts, that it appears to me to be an object of considerable national importance to increase its quantity, and to enable the makers to furnish it at a lower price than that at which it has hitherto been sold. For, if soda could be sold cheap, I am of opinion that it would soon supersede in a great measure (though not altogether) the importation of pot and pearl ashes. There

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is now a large consumption of Russian and American potash by dyers and colour-makers; but owing to a deficiency of wood in those provinces where potash has usually been made, the produce has gradually decreased, and the article has every year become more and more adulterated. Hence, many of the consumers have been induced to substitute crystallized soda in their several trades and manufactures for potash; and I have no doubt but if the duties were taken off common salt, soda would be produced in these kingdoms in such abundance that the makers of Prussian blue and some other colours would employ it to the utter exclusion of potash from their manufactories, potash being altogether an article of foreign produce.

10. ENGLISH BARILLA has also been made of excellent quality from common salt. I have a near relative who has made very large quantities of barilla from common salt, in the Island of Jersey, where he

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obtained the salt (brought to that island from Liverpool) at 2*l.* per ton; but the heavy duty on common salt in this country has entirely prevented the manufacture of barilla in these kingdoms. Owing to the high price of foreign barilla, many of the large soap-makers in London and elsewhere have erected reverberatory furnaces upon their own premises, for the purpose of converting the salts which they obtain from their waste lyes, into mineral alkali, and this practice has now been carried on for several years with considerable success. I have, therefore, no doubt but that if the duties were to be taken off common salt, most of the persons who have these reverberatory furnaces ready, would *immediately* employ them in the alkalization of common salt.

11. Corrosive Sublimate is an article which is always made from common salt. This very important mercurial preparation is employed not only in surgery, but also

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in calico-printing and in other arts. Hence it is become a considerable article of exportation. There can be no doubt but that a repeal of the salt-duties would occasion an increase in the manufacture of corrosive sublimate, but to what extent I am not able to conjecture.

12. PATENT YELLOW, or Sub-muriate of Lead, is prepared also from common salt. This commodity is used in painting carriages and for other nice purposes. Its employment is general throughout the kingdom, and hence its consumption is considerable.

The last article which I shall mention as one of those into which common salt enters as one of its *component* parts, is that of BAKERS' BREAD. From inquiries which I have made of several bakers, I learn that one bushel of flour generally requires one pound of salt. Hence it may be presumed that every adult consumes two ounces of salt per week, or six pounds

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and a half per annum, in bread only. This upon ten millions of people will amount to sixty-five millions of pounds, or upwards of twenty-nine thousand tons.

To enumerate all the remaining sources of consumption of common salt would be very difficult, and is what no one individual would perhaps ever be able to accomplish. A slight sketch of some of the most important uses of this valuable natural production has, however, been attempted, as follows:

1st. In the British fisheries.

2d. In salting provisions for the navy.

3d. In curing provisions for exportation

For these purposes the consumption of salt would probably be very much increased, if the consumer could obtain it free from duty. But the remission of the duty would, in my opinion, operate in a very important way towards the increase of our trade in fish and other provisions,

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by enabling the salt-proprietor to expend more time in the production of his salt, and hence he would be able to render it to the provision-curer in a state of greater purity. Much of our English salt is unfit for the curing of fish, on account of the muriate of magnesia which is contained in it. This salt has so great an affinity for water, that, however dry it may be made, it will soon absorb water from the atmosphere sufficient to occasion its complete deliquescence; and this operates in dissolving the particles of pure salt which are in contact with it, and hence such salt is totally unfit for curing several kinds of fish; and when it has been employed it has often occasioned the loss of immense cargoes, as I have been informed. And this will not appear strange, when it is considered that merely its own weight of water is all that is necessary for the complete solution of muriate of magnesia; a circumstance which renders it impossible to preserve such salt for any length of time in a dry state.

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Now it has been found that the muriate of magnesia abounds most in that salt which is prepared by the *rapid* evaporation of sea-water. Whenever salt shall be reduced to one tenth or to one twelfth of its present price, the consumers may afford to pay for its being evaporated in a *slower* manner, and thus they would obtain an article of greater purity. Moreover, if the duty were taken off common salt, the curer of provisions might afford to allow it to undergo a separate process, by which every particle of the obnoxious matter might be separated. This could be effected at the expense of one shilling per cwt. and salt so prepared might be preserved in a state of perfect dryness in all climates, and even mackarel might be cured with it, and preserved in a sound and palatable state for any length of time that might be desired.

4th. Common salt is consumed in large quantities by the butchers of the metropolis and other large towns, for salting hides.

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5th. By the makers of morocco leather in some of their processes. A dealer in salt, of great respectability, informs me that some of his customers use two or three sacks, of two cwt. each, of salt per week, for this purpose.

6th. Common salt is used also by the skinners, but in what quantities I am not acquainted.

7th. The consumption of salt by housekeepers, for the use of the table and for various culinary purposes, must be very considerable; but I have not had time sufficient for making any thing like an accurate computation of the quantity which is thus used.

8th. The consumption of salt by farmers in making butter and cheese is also very considerable.

9th. By farmers for steeping their seed-wheat; a process which has the effect of preventing the *smut* in wheat. The quantity of salt which would be consumed by the agriculturist may be, in some measure,

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apprehended from a circumstance mentioned by the late Bishop of Landaff, in his Chemical Essays, who tells us that when waste salt was allowed for such purposes, three thousand tons of salt were sold at Northwich alone, to the farmers of that district, in one year. But what the consumption by agriculturists would be if salt were to be obtained in every part of these dominions at any thing like the then Northwich price, no one at present can, I am sure, attempt to calculate.

10th. Another important use of common salt, is for the preserving whale blubber in the Greenland fishery.

11th. There is a considerable consumption of salt in glazing some kinds of earthenware. And I submit, whether, if the duty were taken off salt, it would not in many instances be substituted for the poisonous preparations of lead which are now so abundantly employed in glazing many of our culinary utensils? And this, perhaps, is a circumstance of more universal

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importance than may at first be imagined. For, whenever vinegar or any other acid is poured into such vessels, a part of the lead glaze becomes dissolved, and an insidious poison enters into the stomach. Moreover, if the use of common salt were to be much extended in the potteries, the health of the workmen in that district would be restored; whereas at present they are all subject to paralysis, from the circumstance of their hands being constantly immersed in so deleterious a mixture as that containing a large portion of the solution of oxide of lead.

12th. Common salt is employed by all iron-founders in making their metallic cements.

13th. Common salt has also been used by the makers of iron, for the purpose of rendering bar iron extremely malleable. The late Mr. John Wilkinson, the iron-master, used to say, that if he could obtain common salt free from duty he could make bar iron of finer quality than *had ever been*

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seen; and by this means he would be able entirely to supersede the necessity of importing any iron for making steel, or for other purposes, either from Russia or Sweden.

14th. There is a considerable consumption of salt by whitesmiths and cutlers, in the operation of case-hardening.

15th. Salt is employed likewise at Sheffield and Birmingham in the process of tempering files and some other edge-tools.

16th. Common salt is employed, intermixed with other materials, for the reduction of metallic ores and in the assaying of minerals, as it has the property of rendering the metals more fusible.

17th. Common salt is used by the refiners of silver.—Hence the repeal of the duty would in this, as well as in innumerable other instances, operate to promote the prosperity of the manufactures of the country.

18th. Common salt is employed to cover some of the metals when in a state of fusion, to prevent oxidizement,

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19th. This article of universal employment is used also in many cases in the arts, in order to moderate the flame of combustible bodies. In these latter cases I avoid deducing particular instances, as this would occupy more time than would willingly be allowed me.

20th. Common salt is also used by gardeners for preventing the depredation of insects on fruit-trees; and I submit, if the duty were taken off salt, whether it would not soon be used for a variety of other horticultural purposes.

21st. Common salt is employed by the philosophical and manufacturing chemist, for making frigorific mixtures, and for many other purposes.

22d. Salt is constantly in use by the druggists throughout the kingdom, for a variety of pharmaceutical purposes. But what quantity of salt may be used by the apothecaries, druggists, and chemists, collectively, I have no means of ascertaining.

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QUESTION III.—*What* NEW *manufactures from salt, or otherwise, do you think would be established in this country, and how far would the present manufactures be increased and improved, by the repeal of the salt-duties?*

Answer I. It is impossible to ascertain what number of new manufactures would rise up in consequence of the repeal of the salt-duties, because I apprehend that whenever these duties shall be repealed, such an impetus will be given to the manufacturing interests in general, that every manufacturer and tradesman in the kingdom will immediately set himself to inquire and contrive, in what new way he can employ an article of such general application, and which will then be to be obtained with so much facility, and at so inconsiderable a price.

There can, however, be no doubt but that a great number of manufactories of

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mineral alkali will be established in every part of these kingdoms, immediately upon the repeal of the duties on common salt. At present the greatest part of our mineral alkali is obtained from barilla, which is an article brought from Spain, and from sundry islands in the Mediterranean; but then, many hundreds of our own people would be employed in preparing this important article at home, from English rock salt; and I do believe that in a very short time the importation of foreign barilla would entirely cease.

Within these few days I have been informed, that an enlightened individual, a resident in Scotland, is now in London for the purpose of memorializing the Board of Excise not to oppose him in an intended application to Parliament, for the permission to be allowed salt duty-free for the purpose of making mineral alkali by means of a natural schistus, or sulphuret of alumina, which occurs upon his own estate, and which he represents as being admira-

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bly well adapted to the purpose.—On this proposal I think it my duty to remark, that there are places in various parts of the kingdom containing an abundance of materials which are as suitable for the decomposition of common salt as the Scotch schistus —it would, therefore, be extremely hard if an exclusive privilege were to be granted to one individual*. There is, indeed, an instance of a monopoly of this kind now on the Statute books; and at this moment the proprietor of a certain salt-spring at Long Benton, in the county of Northumberland, is permitted by act of parliament to take the salt produced from the said spring, free of duty, for the purpose of making mineral alkali; a privilege not al-

* If I had not been very desirous of printing my evidence exactly as it was delivered, this passage would have been omitted, as I now learn that I had been misinformed, and that this gentleman does not ask for an *exclusive* privilege, but with the utmost liberality requests that salt shall be allowed universally for the preparation of mineral alkali. S. P.

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lowed to any other person, or persons, unless to the manufacturers of glass. Unless the permission to use *free* salt be granted universally, and every shackle be removed, so that it may be employed generally, and with the utmost freedom, the great national advantages which are expected to be derived from the total repeal of the duties will, in my opinion, not be obtained.

II. In case the existing laws respecting salt should be repealed, I think it very likely that a new trade would immediately be created that would occasion considerable employment. I refer here to the erection of new establishments for the purification of common salt, for the fisheries and for exportation. I have already stated, that much of our English salt is unfit for the purpose of curing fish, on account of the muriate of magnesia which contaminates it, but which might be separated from it at a cheap rate. By exposing the salt to a gen-

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the heat in reverberatory furnaces, the muriatic acid of the magnesian muriate will fly off, and the magnesia (on a subsequent solution of the salt) will be precipitated. It is well known that muriate of magnesia begins to part with its acid at a temperature a little higher than that of boiling water, and that the whole of this earthy muriate may be thus decomposed, while every particle of the muriate of soda, the common salt, would remain unchanged.

If salt thus treated were to be employed in the British fisheries, the quality of the fish would be so decidedly improved, that the trade of the fisheries would, in my opinion, be very rapidly extended. Considerable buildings would, however, be required for such establishments—but, in the present state of the country, I submit whether the additional employment which this would create would in a national point of view be any inconvenience.

III. In Birmingham, Sheffield, and other

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places, there is a considerable consumption of borax (or sub-borate of soda), a dear and foreign article, which is employed as a flux for metals, and in many operations of soldering; but it has been found that if phosphate of soda could be obtained cheap, it might be employed, with advantage, as a substitute for borax in all these operations. If the duty were taken off common salt, the price of soda would be so reduced, that phosphate of soda would become cheaper than it was ever known, and the workers in metals would find it their interest to use this new salt of English production in the stead of borax. The materials from which phosphate of soda is prepared, are waste bones, which furnish the acid, and common salt, which will yield the alkali.

Many more new articles of manufacture would probably spring up in a short time after the repeal of the salt-duties; or as soon as the manufacturers had felt the benefit of the new order of things, and had

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had time to make the necessary experiments upon salt at its reduced price.

That part of the question which refers to the increase and improvement of our *present* manufactures has in a great measure been answered already; but I have no hesitation in giving it as my opinion, that every manufacture in which salt is employed, would be materially benefited by the repeal of the existing duties.

The manufacture of sal ammoniac, which is nearly annihilated in Great Britain, will then be revived; the manufacture of soap in several districts in the interior of the kingdom, would be increased and improved; several kinds of glass will be rendered cheaper, both for home consumption and for exportation; muriatic acid, or spirit of salt, which is an article of great consumption with all fancy dyers and calico-printers, would be furnished at half its present price; Glauber's salt would also be reduced one half, except that which is now made in the immediate vicinity of the great

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bleachers; crystallized soda would be reduced in the same proportion; corrosive sublimate would then be made at a much less price, which would enable the English makers of this article to compete with all the foreign manufacturing chemists in their own markets; all kinds of stone pottery, mineral yellow, or sub-muriate of lead, English morocco leather, &c. &c. might then be sold at reduced prices, in consequence of the reduced price of common salt. Besides, the butcher would incur only one tenth of the present expense in salting hides; the Greenland trader would have great facilities in preserving the whale blubber; the hay for our horses would be better preserved; and we ourselves should always enjoy the luxury of good and wholesome bread, as the smut which destroys so much of our corn would then be entirely prevented. But in a national view, I know of nothing more important (the improvement in our agriculture and fisheries excepted) than the improvement which might

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be effected in the manufacture of bar-iron by the remission of the salt-duties—for, if the late Mr. John Wilkinson was correct in his experiments, an abundance of duty-free salt would enable us to produce bar-iron at home, equal in quality to the purest and most malleable iron which we are in the constant habit of importing from Sweden.

The answer to the FOURTH QUESTION, "*How far the supply of new articles made from salt duty-free, would benefit our other manufactures and increase our articles of export,*" will require but few words. The most important of the *new* articles would doubtless be that of the mineral alkali—and when it is considered what a variety of uses mineral alkali has in a manufacturing country, and how considerable its consumption is in the varied forms of barilla, kelp, natron, and soda, we cannot hesitate to believe that any measure which

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would give us these important articles in greater abundance, would confer a lasting benefit on the general manufacturing concerns of the nation.

Oxymuriate of lime and the other oxymuriates which are employed in bleaching, are produced in France, and other nations on the continent of Europe, in as great perfection as they can be made in England; but, as we have within ourselves such abundance of manganese, salt and lime, (the only materials, except oil of vitriol, which are necessary for making the bleaching salt,) I do think that when trade generally revives in Europe, this article of chemical manufacture will become a considerable and profitable article of exportation.

In reply to the FIFTH QUESTION, "*What do you know as to the use of salt as a manure, or its employment for hay or cattle?*" I know but little of agriculture, and have

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never made any direct experiments on the effect of common salt when applied to land, or used for any other purposes of farming —but I very well recollect the circumstance of being waited upon twenty years ago by an old gentleman from the county of Lancaster*, to ask my opinion as to the effect which would be produced on the price and consumption of mineral alkali, by having salt duty-free. In some of the conversations I had with this gentleman, I recollect he told me, that the remission of the salt-duties had been his chief object of pursuit for many years, and that in furtherance of this object he had made a great variety of experiments on his own estate, as to the effect of salt upon land; and that the result of all these had convinced him, that although different kinds of land require different proportions of salt, yet, if it

* Since this evidence was given I have recollected that the name of this gentleman was Hollingshead, and that he resided in the neighbourhood of Chorley.

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were employed in the proportion of one bushel only per acre, it would not fail to be beneficial.

As I have before said, I have nothing from my own knowledge to communicate on the subject of agriculture; but if I have not taken up too much of your time already, I have a few striking facts, collected from sources of undoubted authority, which I should like to have the honour of laying before you.

The Members of the Board having signified their assent, Mr. Parkes made the following observations:

Common salt is employed by the farmer not only for manuring land, but for preserving hay; for macerating seed wheat and other grain; and for preserving the health of horses, cattle, and sheep.

In Hindostan and China, all the land on the coast is treated regularly with sea-water, and they depend solely upon this management for the goodness and increase of their crops of rice.

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In Poland salt is employed when they till the land. See Dr. Rees's Cyclopedia, vol. xxxi. part 1. article *Salt*.

In the 24th volume of Young's Annals of Agriculture is an interesting paper on the use of salt to gregarious animals, taken from the Memoirs of the Royal Academy of Paris.

In the provinces of Munster and Connaught in Ireland, it is customary for the farmers to lay salt on slates in their grounds, for the benefit of their horses when at grass.

In the 4th volume of the Communications to the Board of Agriculture there is a very long paper by the Rev. Mr. Cartwright, which in an unanswerable manner proves the efficacy of salt as a manure. Among many other experiments, he prepared twenty-five beds in a field, each one yard wide and twenty yards long; these he treated with ten different manures, most of which are well known, and he mixed different proportions of salt with the greatest part of them, and then he planted the

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whole with potatoes. Where the salt was used, the crop was found to be superior in all, except in one instance, and this he accounts for. Besides, in every case where salt was used, the roots were free from that scabbiness which was apparent on all those where the salt was not employed, and there were forty more beds in the same field.

The whole of his communication is very interesting. On grass land he did not find the salt to be equally efficacious.

The reading of the written evidence, as originally delivered by Mr. Parkes at the Board, was then resumed as follows:

In answer to the LAST QUESTION, my opinion is, that the repeal of the salt-duties would give such a general impetus to the manufactures, fisheries, trade, and commerce of the country, that there would *immediately* be an increased demand for labour; and that this would be to such an extent as to operate very beneficially not

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only on the poor, but also on every class of the community. The sudden acquisition of so cheap an article as duty-free salt to the agriculturist, would in my opinion occasion the immediate employment of many thousands of the unemployed population of the country;—the extension of the fisheries would require vast additional buildings in most of the present, not to say any thing of the *new* establishments;—and the creation of new manufactories for the preparation of the mineral alkali from salt, would call into exercise a great number of the workers in brick and stone, to erect the necessary furnaces, &c. for such establishments—and these, when completed, would afford permanent employment to a very great number of additional hands.

It does not fall within my province to say any thing of the relief which would be afforded to our very indigent poor, by the repeal of the salt-duties—or of the increased nursery for seamen, which an ex-

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tension of our national fisheries would afford us ; otherwise, one might indulge in some very delightful anticipations on these, and other subjects intimately connected with the important measure which now occupies the attention of this Honourable Board.

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Some of the friends of the Repeal of the Salt-Duties having intimated to Mr. Parkes their desire that he would consent to give some further evidence to the Honourable the Board of Trade on this subject, certain questions were submitted to him for that purpose, upon which he delivered the following evidence.

Friday, April 11th, 1817.

Mr. SAMUEL PARKES called in and examined.

QUESTION I.—*If the duty were taken off common salt, at what price do you suppose you would be able to manufacture English barilla?*

I am of opinion that if salt be allowed duty free, mineral alkali, of the value of good marketable Spanish barilla, may be made for about one third of its present price, or for ten or twelve pounds per ton

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in Great Britain, and perhaps lower, whenever the makers shall have become perfect in the use of their own processes.

II.—*In your former evidence you mentioned the salting of hides; what do you imagine is the consumption of salt for this purpose?*

Respecting the salting of hides, I have learned from further inquiry, that the butcher usually applies five pounds of salt to every ox- or cow-hide which he has occasion to lay by, or to send to the tanner at a distance.

III.—*Can you give us any information respecting the consumption of salt in glazing earthenware?*

I am informed that the *stone* potter usually pays one twelfth of the real *amount* of all his sales of pottery-ware in the purchase of salt. It is a question with me, if the duty were taken off salt, whether many articles now made in white ware would not be made in the old way (viz. without

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employing poisonous materials, such as oxide of lead,) particularly milk-pans, and large culinary vessels, and these glazed with common salt.

IV.—*What do you conceive to be the national consumption of salt for making spirit of salt, or muriatic acid?*

In my former evidence I stated that I consumed about twenty tons of salt annually, which cost me 70*l*., for making muriatic acid. Since then I have thought more on the subject of muriatic acid, and am now of opinion that in similar manufactories throughout Great Britain, one thousand tons of common salt are consumed annually for this purpose only.

V.—*If the duty were taken off salt, what quantity of mineral alkali, in the form of English barilla, do you suppose would be manufactured here?*

Respecting mineral alkali, I am of opinion that ten thousand tons would be used in Great Britain, as soon as the new pro-

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cesses could be established;—that the low price would so increase its consumption, that in a short time fifteen thousand tons would be demanded for home consumption; and that a much larger quantity than this might be exported to the different states in Europe, and to the Continent of America.

In making this calculation, it is upon the supposition that each ton of the English mineral alkali shall be of equal value with a ton of Teneriff or Spanish barilla *.

Here the evidence closed.

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* When I gave this evidence, it was upon the supposition that a very small duty would be laid upon the manufacture of mineral alkali, somewhat similar to that which is now paid upon the same article by glass-makers; I therefore think it absolutely incumbent upon me now to state, that if a large duty be imposed upon mineral alkali, I am decidedly of opinion that few persons, if any, would engage in the manufacture of it; and that the quantity made from common salt in Great Britain would then be very inconsiderable.—S. P.

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APPENDIX.

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APPENDIX

TO

THE PREFACE,

CONTAINING OBSERVATIONS ON THE SALT-DUTIES, EXTRACTED FROM THE AUTHOR'S CHEMICAL ESSAYS.

I. *Remarks on the impolicy of the Salt-Laws, and on the employment of salt in manufactures.* From the Additional Notes to the Essay on Barytes.

"THE impolicy of subjecting salt to a duty is now generally acknowledged; it is therefore ardently to be wished that some means could be devised of persuading our Government to abandon this tax, or to substitute some other less objectionable article in its place. The abundance of salt which we possess has not long been of service to the country, for in the sixteenth century we had no people among us who understood the art of boiling and refining salt. In

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the year 1563, an Act of Parliament states that 'certain strangers of excellent ingine' had brought a new and improved method of making salt into Scotland, and that during fifty years these persons might make salt *exclusively* for the fisheries, &c.—*Statute* 71 *Parl.* 9 *Queen Marie.* Even ten years after these strangers were incorporated in Scotland for the refining of salt, the commodity was so scarce and dear, that an act passed to prohibit its exportation for three years.—*Stat.* 56 *Parl.* 4*th James VI.*

"The Government of France appears to be as impolitic with regard to salt as the English; for only a few years ago 'Buonaparte abolished the collection of turnpike dues;' and a tax on salt, payable at the salt-pans, was imposed in its stead. The well-known *Gabelle* was a tax on retail; and though the present impost is not so offensive in appearance, it is equally burdensome in reality.' It appears that this salt tax was charged for the purpose of repairing the roads, a the time that the grand entrance into Italy was constructed over Mount Simplon.—See *A Letter on the Genius of the French Government,* octavo, Philadelphia printed, London reprinted 1810.

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"In the year 1789, Berthollet made an excellent proposal to the French Government, to remit the duty on salt for all purposes of manufacture, on condition that one pound of sulphate of iron should be mixed with every quintal of salt, which, as he says, would change its colour and alter its taste so as to prevent its being used fraudulently.—See *Annales de Chimie*, tome ii. page 182.

"For an account of the first discovery of the salt-pits in Cheshire, of the thickness of the bed of salt, and other curious matter relating to this subject, see Dr. Holland's *View of the Agriculture of Cheshire*, octavo, 1808, page 24 &c."—*Chemical Essays*, vol. v. page 107-9.

II. *On the decomposition of common Salt.* From the Essay on Barytes.

"But there is a purpose not yet named, and to which this peculiar substance, barytic earth, might be applied, which would be of more importance, medicine excepted, than any other for which it can be used. I allude to the decomposition of common salt, and the separation of its alkali.

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"Whenever the carbonate of this earth shall be found among us in as great plenty as its sulphate (and I have not the least doubt but that this inestimable treasure is distributed in abundance in various parts of these islands) we shall have within ourselves ample means of preparing the mineral alkali, without applying to Spain and other places on the continent.

"Wherever there is an establishment for the distillation of the pyroligneous acid, the manufacture of this alkali might be carried on to great advantage; for this acid would expel the carbonic acid from the barytes, and then by submitting it to a proper heat, the acetous acid would be burnt off, and the barytes would remain free and sufficiently pure for use.

"If the barytic earth, thus prepared, be simply thrown into a solution of common salt, it will immediately occasion its decomposition, and muriate of barytes with caustic soda will be produced.

"The abundance of pit coal which is distributed in various places, together with our other peculiar advantages, have enabled this island, as a manufacturing country, hitherto to stand unrivalled: how much therefore is it to be re-

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gretted that two such invaluable treasures as our mines of rock-salt and barytic-earth should still continue locked up from an enterprising people, by a prohibitory impolitic and excessive impost!"—*Chemical Essays*, vol. ii. page 245-248.

III. *On the manufacture of Mineral Alkali, and on the repeal of the Salt-Laws.* From the Essay on the Fixed Alkalies.

"It would be improper to close this Essay without remarking that there are other sources from which the manufacturer may derive an abundant supply of the mineral alkali, besides those already mentioned. I refer now to the immense depositories of sea-salt which occur in various parts of the world, particularly in Hungary, Poland, Russia, Spain, and America, and to that inexhaustible source the ocean itself, in which prodigious quantities of the same saline body are perpetually held in solution.

"The rocks of salt in the British Islands are far from being inconsiderable; but the many thousands of tons of it which are continually washing our shores, would furnish a most plen-

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tiful supply for every purpose whatever, whether for manufacture, agriculture, or any other branch of the arts. Its decomposition, so as to separate the soda, would not be difficult; and should this be effected, it would preclude the necessity of sending the wealth of the kingdom to foreign countries for the purchase of mineral alkali, would our Government allow us to take without duty, that which nature offers so profusely for our acceptance.

"If Government would allow us either rock salt, or sea water, free of duty, various means might be devised for producing an abundant supply of the alkali in question.

"In the Annales de Chimie there is a very valuable memoir which was published by the order of the Committee of Public Safety during the period of republicanism in France, which gives various methods by which muriate of soda (common salt) might be decomposed and the alkali prepared for sale, so as to supersede the necessity of their buying Spanish barilla.

"This memoir, which is very long and circumstantial in its details, offers so many interesting considerations to the people of France, that an Englishman must be devoid of all patriotic

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feelings who could read it without wishing it were in his power to offer some other source of revenue to the consideration of his own government, or some article equally efficient in its produce, to be accepted as a commutation for the present impolitic duties on salt.

"This subject has often occupied the attention of Parliament, and the reports of its committees contain a variety of arguments and facts to show the existing necessity for the total repeal of the present laws relating to salt. The difficulties which have arisen whenever this business has been brought under consideration, have been many, and some of them so perplexing, as hitherto to have prevented the success of the several applications to the Legislature for the removal of the present impost. I do hope, however, that the time is not far distant when the matter will be again taken up by some competent individual, who will indefatigably pursue his object to its complete accomplishment, and who will no doubt be well supported in so patriotic a scheme for the benefit of the British nation."

Chemical Essays, vol. iii. page 182-189.

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IV. *On the decomposition of common Salt for the purpose of Glass-making, with a description of the process.* From the Esssay on the Manufacture of Glass.

"Before we proceed further on our subject I wish to inform my readers, that, for the production of the soda, the glass manufacturer is allowed common salt free of duty; which is a circumstance of considerable importance, especially as I have reason to believe that there are several glass makers in the kingdom who are not aware of their privilege in this respect. Every manufacturer of glass is entitled to this allowance, whatever the species of glass may be, which he is in the practice of manufacturing; I have therefore thought it would be rendering an acceptable service to many individuals, to inform them how they may readily decompose common salt, and also how dispose of to advantage the residuum which arises from the process.

"It will be necessary in the first place to make an entry of a room for making mineral alkali, or *flux for glass*, as it is termed in the Act of Parliament; and when due notice has been

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given to the officer of excise who surveys in the district, the manufacturer may commence the following process.

"Any quantity of common salt may be dissolved in a boiler of hot water, and nearly double its weight of American or Russian pearl-ash added to it. This will produce a double decomposition, and two new salts will be produced, viz. muriate of potash and carbonate of soda. If the liquor be then concentrated by evaporation to a certain point, which may be easily known by a little experience, the muriate of potash will crystallize; and then the remaining alkaline liquor may be further evaporated till the carbonate of soda be recovered in a dry state. The mineral alkali thus produced may be used instead of purified pearl-ash, in the manufacture of the finest kinds of glass, and the muriate of potash may be sold for the purpose of making alum, for which it is very suitable.

"It appears to me that every glass maker should prepare his own alkali, because he has the exclusive advantage of a drawback of the whole of the duty on the salt employed, amounting to thirty pounds per ton, and he will then

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have a more suitable alkali for his business; and considering that soda will saturate more silex than potash, the saving will be at least thirty or forty per cent. on the amount of the alkali consumed."—*Chemical Essays,* vol. iii. page 461-466.

V. *On the employment of Saline Residuums for purposes of Horticulture.* From the Essay on Bleaching.

"In bleaching districts it is usual to cast away the residuum of the stills as a worthless article; but surely if some competent person were employed to separate the sulphate of manganese from the sulphate of soda, and this were done on the spot where the residuum is produced, the alkaline sulphate would be productive of considerable profit.

"In like manner might the waste solutions of the oxymuriatic salts be turned to a good account. The discovery of Humboldt, that a weak solution of such preparations has the property of accelerating and enlarging the growth of vegetables, I have in another work already noticed; and I am now anxious to remark,

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that gardeners whose grounds are in the neighbourhood of bleach-fields would do well in availing themselves of all the advantages their situation affords them for making experiments on this interesting and important subject."—*Chemical Essays*, vol. iv. page 160.

VI. *On the employment of the Bittern from the English and Scotch Salt-works.* From the Essay on Sal Ammoniac.

"There is a mode of making sal-ammoniac, which I conceive would be more economical than any of those already mentioned. It consists in the employment of the bittern of the salt-works, or the mother waters which remain after the extraction of common salt from sea water.

"This is not a mere theoretical notion; for the process has more than once been acted upon, and at this time large quantities of sal-ammoniac are actually made according to this principle, in some parts of Scotland; though I apprehend few English practical chemists are familiar with the method. It was the desire of making this valuable and economical process more generally known, that induced me to ren-

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der the manufacture of sal-ammoniac one of the subjects of these Essays.

"The preparation of this important salt by means of bittern is not, as I have said, a new process, for I recollect reading an account of it many years ago in one of the volumes of the Annales de Chimie*, and in other works; but knowing the Board of Excise in England would not allow the use of bittern, nor even the burnt pickings of the salt-pans, free of excise duty, I imagined this to be one of those processes which are interdicted by the high price of the materials, till an accidental circumstance lately recalled my attention to the subject, in a very particular manner.

"Some time ago, a Mr. Astley of the town of Borrowstoness near Leith, who had taken out a patent for the manufacture of sal-ammoniac by combustion, in which he proposed to burn bones, blood, and other animal matters with the bittern, proceeded by due course of law against a gentleman of the same town, for having infringed his patent, and the cause came to be tried before the Lords of Session of Scot-

* See tom. xx. page 186.

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land. The question, however, not having been determined by the court, it was agreed between the parties to defer final judgement till the opinions of some practical chemists in London should be obtained on the subject; and it was during my examination before the commissioner appointed by the Lords of Session to take our report, that I first obtained the information that the Board of Excise allows the inhabitants of *Scotland* the bittern of salt-works free of duty.

"On acquiring the knowledge of this fact, a question immediately occurred—If the inhabitants of one part of the empire are allowed an article which is capable of being used in our manufactories duty free, why should not the same indulgence be universal in England and Ireland, as well as in Scotland?

"Reflecting still more and more on this subject, and knowing that the riches of a country depend, in a great measure, on its producing within itself most of the articles required for its own consumption, I think it my duty to make this circumstance more generally known, in the hope that some competent person, possessing the advantages of capital, and a favour-

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able locality of situation, would petition the Legislature for leave to commence such an undertaking, and thus relieve the country from the necessity of sending into another quarter of the globe for a supply of this valuable and necessary commodity.

"If a company of persons, accustomed to the manufacture of sal-ammoniac, was established in the neighbourhood of any of the salt-works in Cheshire, or near the salt-pits of Droitwich in Worcestershire, and could obtain permission from Government to use the bittern which is produced at either of those establishments, and which is at present thrown away as a useless residuum, I am certain that such a company would be enabled to afford the article in question much cheaper than the English sal-ammoniac has ever yet been sold, and at a rate which would effectually prevent the importation of ammoniacal salt from any part of the East."—*Chemical Essays*, vol. iv. page 373—379.

"Having thus entered, rather fully, into the merits of this subject, I have only to remark, that I have no doubt, when a proper application is made to the Legislature to release the

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bittern of the salt-works from the cognisance of the Excise, when employed for the manufacture of sal-ammoniac, that the people of England will be put in as favourable a situation in this respect as those of Scotland; the first object of every British senator, next to that of preserving the tranquillity of the state, being to strengthen the resources and encourage the manufactures of the country.

"Ormus, the celebrated depôt for the sale of the merchandize of the ancients, and the grand capital of an Arab monarch, is in itself the most parched and barren spot in the world, where the people receive even the water they drink from a neighbouring country; but it became rich by the cultivation of trade, and the commerce of this otherwise miserable island made it the envy of the surrounding nations.

"Long has the island of Britain in like manner enjoyed the blessings and luxuries which arise from an extended trade; and though we are now in the possession of the greatest part of the traffic of the world *, we must not expect

* It may be necessary to say that this passage was written at the close of the year 1814.

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to preserve this proud pre-eminence, unless the Government determine to pay the most sedulous attention to all our minute interests as a manufacturing and commercial people."—*Chemical Essays*, vol. iv. page 393—395.

VII. *On the employment of the native Produce of a Country.* From the Additional Notes to the Essay on Carbon.

"I have lately met with a passage which so exactly coincides with what I have said respecting the policy of exporting none of the native materials which we can ourselves employ, that I cannot resist the pleasure of transcribing it. 'EITHER EXPORT or CONSUME,' says M. Seigneaux de Correvon to the Economical Society of Berne in Switzerland. 'The truth of this maxim,' continues he, 'cannot be contested, the alternative is indispensable. There must either be a liberty without shackles, or an interior consumption by a number of inhabitants proportioned to the means of nourishing them. Thus, under the reign of Queen Elizabeth, in England the exportation of wool was prevented: from thence the manufactures and arts

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increased the number of men, and the exportation of corn also permitted the same augmentation, by the immense profits which were opened to cultivation. It is then clear, that all raw materials which may be further wrought should be kept at home, until they have acquired, by the labour of the inhabitants, all the value of which they are susceptible.'—*Prize Essays on the Spirit of Legislation,* octavo, London 1772, page 406. 'It is reckoned that a million pounds worth of unwrought materials produces from six to ten millions when fabricated.' *Ibid.* page 59.—*Chemical Essays,* vol. v. page 141.

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NOTES

To elucidate and corroborate the Evidence which was given on the 8th and 11th of April, 1817, before the Right Honourable the Committee of His Majesty's Privy Council for the Affairs of Trade, on the proposed Repeal of the Duties upon Salt.

On Sal-Ammoniac.

1. *The Bittern from Salt-works.* Page 22, line 17.

About a century ago, a work was established near the metropolis by a Mr. Goodwin, a chemist of London, for the production of sal-ammoniac by mixing the bittern of sea-water with various ammoniacal matter. Baumé formed also a similar establishment in France, where he decomposed the muriate of magnesia contained in the bittern of sea-water, by means of

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a rough ammoniacal liquor procured from the distillation of animal substances. I find also from the testimony of Mr. Dossie in his Institutes of Experimental Chemistry, 2 vols. octavo, printed in 1759, that a similar establishment was formed in England about the year 1740 under the sanction of a patent; but he does not inform us either respecting the names of the party, or the place where their operations were conducted. From these circumstances it appears that no doubt can be entertained of the efficiency of the salt bittern for the production of sal-ammoniac.

2. *Consumption by the Workers in Metals.* Page 23, line 1.

Besides the use of sal-ammoniac in soldering metals, it is also employed by the dyer to moderate the action of aquafortis in the preparation of nitrate of tin, and also by the same artists for the purpose of modifying the hue of various colours in the operation of dyeing. It is likewise employed by the workers in copper and iron, to prevent the oxidizement of those metallic surfaces which they intend to cover

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with tin; in pharmacy for the preparation of several important medicines; and by the manufacturing and philosophical chemist in a variety of ways, such as, for the production of artificial cold in some of his peculiar processes; for analysing certain metallic ores; for the extraction of pure liquid ammonia; and for the preparation of the white ammoniacal salt, which on account of its solid form is in a variety of ways convenient and useful.—This short account of the various uses of sal-ammoniac is given for the purpose of showing that its consumption would be considerable at home, and that it might become a valuable article of export, if the existing duties on common salt were repealed. I am, however, desirous of saying that the consumption of sal-ammoniac is not likely ever to be *very* great; and that I made it the first article of my evidence before the Honourable the Board of Trade, merely because I conceived it to be one of those which deserved only a minor consideration when compared with the great mass of commodities which are prepared from common salt.

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On Glass.

3. *Soda from common Salt.* Page 24, line 15.

On this subject it may be important to remark, that the glass-makers, who avail themselves of the privilege of taking salt duty-free, repay themselves, in some measure, the great expense of the pearl-ash which they consume in the process, by the sale of the *muriate of potash,* which results from the decomposition of the salt, to the makers of alum. But if the majority of the glass-manufacturers were thus to prepare their mineral alkali from salt, by means of pearl-ashes, the makers of alum would not be able to consume one half of the muriate of potash which would be produced, and the glass-makers would be under the necessity either of giving up the preparation of mineral alkali, or of resorting to some other process for its production. I am, however, of opinion that the public will never be in possession of a cheap mode of decomposing common salt for the separation of its alkali, until the Government permits the unrestrained use of salt free from duty.

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The number of glass-manufacturers distributed throughout Great Britain is very considerable; and yet there are, I believe, only three establishments for the manufacture of plate-glass. From the proprietor of one of these works I received a letter, only a short time since, complaining of the expense of his present process for making mineral alkali, and inquiring after one which would be more economical. The moment the public shall learn that salt may be obtained with the same facility as we now obtain coals, hundreds of hands and heads will be employed upon the means of decomposing salt, for the production of the article in question; and mineral alkali, for the use of these and every other manufacturer who may require that substance, will very soon be to be had in abundance.

On Bleaching Salt.

4. Salt allowed without Duty. Page 25, line 15.

Some idea of the large consumption of salt for the preparation of the oxy-muriate of lime may be acquired by perusing the following statement, which I was not in possession of when I delivered my evidence.

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The drawbacks which were allowed upon the salt consumed by the makers of the oxy-muriate of lime, from the 5th day of July 1814 to the 5th of July 1815, amounted to the sum of 44,529*l.* 10*s.* 0½*d.* although at this time the makers of the article for sale were allowed no drawback.

On Muriatic Acid.

5. Employed in a variety of processes. Page 26, line 24.

While advocating the propriety of repealing the duties upon common salt, I should think myself culpable if I neglected to mention a circumstance which I apprehend many people are not aware of, viz. that if salt were to be obtained duty-free, and the Legislature does not impose a higher duty upon English mineral alkali than what it now bears, the spirit of salt, or muriatic acid, notwithstanding it is employed in such a variety of processes in the arts, would soon become of little or no value. The large quantities of mineral alkali which would then be prepared, would occasion so unusual a production of muriatic acid, that the various manufacturers who require that article would

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obtain it at a very insignificant expense. The value of the muriatic acid ought, therefore, not to be taken into the account, when calculating the probable profit of making mineral alkali from salt free of duty.

On Glauber's Salt.

6. *The caput mortuum of Muriatic Acid.* Page 27, line 9.

Whenever the duty is entirely taken off common salt, it is probable that more caput mortuum, or sulphate of soda, would be produced than could possibly be consumed or exported in the form of Glauber's salt; and this may be anticipated as an objection to the repeal of the salt-duties. It should however be recollected, that whatever caput mortuum there might be, exceeding the quantity required for Glauber's salt, such caput mortuum might be readily converted to mineral alkali; and the more readily, because it will already have undergone one half of the process of alkalization.

And here I cannot help remarking, how ill-advised it would be if the Legislature were, on the repeal of the salt-duties, to lay a tax upon

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English mineral alkali, as some persons have proposed, equal to that which is now paid upon foreign barilla; because, a ton of rough sulphate of soda, capable of making a ton of English barilla equal in quality to the foreign barilla, can at this moment be bought at a less price than the amount of the proposed duty; although this caput mortuum, or rough sulphate of soda, has actually been made from salt which had paid the full duty of thirty pounds per ton.

On Magnesia.

7. *Magnesia from Salt Brine.* Page 30, line 1.

I am desirous of remarking, that owing to the operation of the laws relating to salt, the manufacture of magnesia was nearly driven from this country; and for some years most of the magnesia which was consumed in Great Britain, or exported by her merchants, was prepared in the island of Guernsey, where the makers had salt-water free of duty. Whether the manufacture of magnesia has lately gone into any other channel, I have not had the means of ascertaining.

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On Soda and Potash.

8. *To substitute Soda for Potash.* P. 31, line 9.

Having omitted to speak of the use of soda in washing, it may be worth while now to observe, that some few years ago there was a considerable consumption of crystallized soda for this purpose in the metropolis and elsewhere; but owing to the charge of making it, in consequence of the high price of salt, it became at last so much adulterated that it injured the clothes and blistered the hands of the operators, which occasioned it to come into disrepute. If the duty were taken off salt, the true soda would be obtained at so cheap a rate, that there would be no temptation to adulterate it; and I am of opinion, that very soon some hundreds of tons of such soda would be consumed in Great Britain, for this one purpose alone, in addition to the quantity which would be required for the various purposes of the arts.

With regard to foreign pearl-ashes the demand in England has increased, while the quantity produced in Russia and in America has decreased. This has occasioned so great an

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adulteration of the article, that a large consumer lately assured me it was with the utmost difficulty he could procure a barrel of genuine American pearl-ashes. It has been a practice to open the barrels and mix a quantity of white English ashes of very inferior value with the genuine; and having refilled the barrels, then to sell them as fresh imported pearl-ashes of first quality. If soda could be made in these kingdoms from duty-free salt, I have no doubt but it would entirely put a stop to this nefarious practice.

On English Barilla.

9. *Barilla made from common Salt.* Page 31, line 19.

Since the proposed repeal of the duties upon salt has occupied so much of the public attention, an idea has been propagated, that if salt could be obtained duty-free, mineral alkali, infinitely superior to Spanish barilla, would be made in abundance in Great Britain; and that, owing to its superior excellence, one ton would go as far in any manufactory as four tons of foreign barilla, and therefore a duty of ten or

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twelve pounds per ton upon such alkali would not be felt by the consumer. In reply to this, I am desirous of stating a circumstance which appears to me to be of considerable importance in determining the amount of duty which will eventually be laid upon mineral alkali, as one of the articles of commutation for the duty on salt.

Having thought much on this subject, and having formerly had considerable experience in the various processes of decomposing muriate of soda, or common salt, I am decidedly of opinion, that whenever the public shall obtain the unrestrained use of salt duty-free, the greatest part of the mineral alkali produced from it, will be offered for sale in a state of as great impurity as any of the foreign barilla which is usually in the market. The reasons upon which this opinion is founded, will, I trust, be considered to be plain and decisive.

In decomposing salt in an economical manner, a large quantity of cheap or refuse articles will be required to assist and promote the separation of the muriatic acid; and these articles, when fused with the salt, will not be more injurious to the soap-maker or the glass-manu-

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facturer than the heterogeneous matters which always occur in the barilla of foreign produce. Not but that *pure* mineral alkali may be obtained from common salt: but the expense of purifying it would be considerable, and such an operation would not at all be necessary for either of the most important classes among the numerous consumers of mineral alkali in these kingdoms.

From these considerations it does appear to me, that if a duty be laid upon mineral alkali, it will be necessary to take some pains in drawing up the bill, lest its provisions should in the end prove nugatory, and the minister be disappointed in the amount which will be derived from this new source of revenue.

On Corrosive Sublimate.

10. *Corrosive Sublimate from common Salt.* Page 32, line 20.

In my evidence before the Honourable the Board of Trade, I stated that muriate of mercury, or corrosive sublimate, is employed not only in surgery, but also in calico-printing,

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and in other arts; I ought, however, to have mentioned that it is also used for making that most important of all other mercurial medicines, calomel, or sub-muriate of mercury. Common salt is always employed in preparing corrosive sublimate, and corrosive sublimate is always used in the formation of calomel. In making corrosive sublimate, every six pounds of quicksilver require twelve pounds of salt; and in preparing calomel, nine pounds of quicksilver require sixteen pounds of corrosive sublimate. Hence it may be conceived that the consumption of salt in the preparation of articles which are so extensively employed in medicine, in surgery, and in the arts, cannot be very inconsiderable; and that when they can be manufactured with duty-free salt, both corrosive sublimate and calomel will become great articles of exportation.

On Sub-muriate of Lead.

11. *Patent Yellow prepared from Salt.* Page 33, line 8.

Among the several agents which have been employed for the decomposition of common salt, the oxides of lead have been found to be

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some of the most powerful. It is therefore to be expected that when the duty is taken off common salt, very large quantities of litharge of lead will be used in the preparation of mineral alkali. From this process there results a large portion of sub-muriate of lead, as a residuum. When this muriated lead becomes heated, it assumes a beautiful yellow colour, known in commerce under the name of Turner's Patent Yellow. The remission of the duty on salt may therefore be expected to reduce the price of this elegant pigment to less than one half of its present price.

On Baker's Bread.

12. *Common Salt in Baker's Bread.* Page 33, line 16.

By the 38 Geo. III. c. 62, it is enacted, that "the magistrates, before they set the assize of bread, shall add to the average price, per quarter of wheat fit for making wheaten bread, fivepence; on account of the additional duty upon salt, so as to increase such average price fivepence per quarter, so long as such additional salt duty shall continue." As this charge of fivepence is only in consequence of the *additional*

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duty which had just then been laid upon common salt, it may be presumed that the framers of that bill could not have calculated the whole expense of the salt used in bread to be less upon each quarter of flour, than eighteen-pence or twenty-pence: I have, however, reason to believe, that at the present price of salt it is not less than two shillings and six-pence. Let the duty on salt be abandoned, and then more salt will be used by the bakers than is at present; the bread, by this addition, will be rendered more wholesome; and the whole expense of salt for making eight bushels of flour into bread, will be reduced to one penny.

Having thus offered a few remarks, in the form of additional notes, upon that part of my own evidence which relates to those articles into which common salt enters as one of its component ingredients, I am desirous, before I attempt the elucidation of the remaining part of that hasty evidence, of affording my readers the means of forming a correct judgement respecting the baneful effects of the Salt-laws, by exhibiting a portion of that kind of testimony

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respecting the *general* operation of those laws, which is upon record, and which will be Considered to be unimpeachable. I shall begin with giving the opinions of some of the committees of the House of Commons, and then proceed to select those of some respectable individuals, confining myself at this time to transcribe such only as treat of the subject generally.

Opinions on the Salt Laws.

13. *The remission of the Duty.* Page 34, line 19.

In the year 1800, a Committee of the House of Commons on the Herring Fishery made a Report to the House on the effects of the Salt Laws, from which I make the following extract:—

"Your Committee have reserved for separate consideration a subject which frequently engaged their attention throughout the whole course of their enquiries,—that of the Salt Duty.

"They cannot forbear to state strongly to the House their sense of the inconveniences

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under which the fisheries labour from the present restrictions, and of the inefficacy of those restraints for the security of the revenue. They cannot better exemplify the first, than by referring to the evidence of some of the most considerable fish-salesmen in London, who state it to have been the constant practice of the trade, to pay duty for the salt they have used in the fishery, as being upon the whole less burthensome than a compliance with the regulations for the use of duty-free salt would have been. Such however was the weight of the duty, that in general the fishermen chose rather to throw overboard the fish, which from detention by contrary winds, or other causes, was not likely to arrive fresh at market, than to cure it. It is stated, that *no inconsiderable part of the supply intended for London has hitherto been destroyed in this manner.* In order to remedy so serious a loss to the public, the Lords of the Treasury have lately (as your Committee have been informed) directed a depôt of duty-free salt to be formed at Gravesend for the use of the fishermen. But this measure, to which your Committee alluded in a former part of their Report, and which was strongly recommended by seve-

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ral of the witnesses who attended them, is, in the opinion of Mr. Jackson, one of the Commissioners of Excise, highly dangerous to the revenue; and indeed it is obvious, that the duty on salt so far exceeds the intrinsic value of the article, as to afford the strongest temptation to fraudulent artifices. How successful such artifices have been in that part of the kingdom in which the fisheries are principally carried on, will appear from the accounts inserted in the Appendix to this Report. It will be seen that in the north-western counties of Scotland, forming in extent more than one sixth of Great Britain, the gross produce of the salt-duty has, on an average of the last seventeen years, amounted annually to no more than 140*l*. There is however reason to believe, that the loss sustained by the revenue on that part of the coast is not solely to be attributed to the fisheries, but that considerable quantities of salt are fraudulently re-imported from Ireland; and your Committee cannot but express their apprehensions, that this injurious practice may be carried to a greater extent after the union of the kingdoms.

"Upon the whole, your Committee beg leave to recommend *a commutation of the Salt Duties*,

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as a measure highly deserving the attention of the House. They are convinced that, for the prosperity of the fisheries, it would be far more efficacious than any possible system of bounties and encouragements, as it would relieve them from all regulations, except such as may be necessary for the preservation and good management of the fisheries themselves: and by rendering the bounties now granted unnecessary, it would produce no inconsiderable saving of the public money, as the bounties on the Herring Fishery amounted in the two last years to 94,041*l.*; and the total amount of bounties for the encouragement of trade, several of which might be either abolished or reduced, in case of a commutation of the salt-duty, is stated in the 23d Report of the Select Committee on Finance to have been, in the year 1797, 386,683*l.* and does not appear to have materially varied since.

"It is not within the province of your Committee to point out the other advantages which would attend such a plan, in cheapening the subsistence of the people, in a reduction of naval and military expense, and in the encouragement of a variety of useful arts; nor to propose

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the means by which it might be effected. It may perhaps be deemed too bold a resolution to sacrifice such a considerable branch of the public revenue in the midst of an expensive war, the progress of which may call for the employment of every available resource; but your Committee being of opinion, that the salt-duties are in their consequences detrimental to the public in a degree *far exceeding the payment of the tax itself*; and observing that the experience of the last years has demonstrated the wealth and energy of the nation to be equal to every exertion which the most extraordinary circumstances may require, they cannot but express their hope that it may be accomplished."—*From the Report of the Committee on the Herring Fishery, in the year* 1800, *to the House of Commons.*

In the next year the Committee on the Salt-Laws made a Report to the House of Commons, from which I make the following important extracts.

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"The Committee appointed to inquire into the laws relating to the salt-duties, and the means of remedying the inconveniences arising therefrom, and to report the same, with their opinion thereupon from time to time, to the House—

"Have proceeded further to inquire into the matters referred to them; and report—

"That from the late period at which the Committee was appointed, it was obviously impossible to investigate completely the important subject referred to them, and to digest any extensive permanent arrangement so maturely as to be justified in recommending its adoption.

"But though, from the shortness of the time, they feel themselves unable to offer any plan of permanent arrangement to the judgement of Parliament, yet they feel themselves indispensably bound to state, that all their inquiries have tended to impress more strongly upon them the extreme difficulty, not to say *the impossibility, of reconciling the collection of any considerable revenue from salt, with the invaluable advantages which would arise from an* UNRESTRAINED *trade in, and an* UNLIMITED *use of,*

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that article. On this subject, the sentiments of the last Committee of the British Parliament on the Herring Fishery entirely coincide with theirs.

"Concurring entirely in the opinion of the Committee of last year, but feeling at the same time most strongly the urgent necessity of supporting the public revenue, in a crisis like the present, by the most vigorous exertions, your Committee have come to the following Resolutions, which they submit to the judgement of the House; viz.

"Resolved,

"That it is the opinion of this Committee, that a commutation of the duties on salt would be productive of many great and important advantages to all descriptions of persons in this kingdom, and would be highly beneficial to its agriculture, fisheries, trade, and manufactures.

"Resolved,

"That it is the opinion of this Committee, that such a commutation can only be effected by some general tax, extending, as far as circumstances will admit, to all the orders of the

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community; all of whom would derive benefit from such commutation.

"Resolved,

"That it is the opinion of this Committee, that it is expedient to postpone the further consideration of this subject till the next session of Parliament."

When this important Report was delivered to the House of Commons, Mr. Pitt made the following declaration; "That whenever the return of peace enabled His Majesty's ministers to venture upon a diminution of the revenue, the repeal of the duty on salt shall have their first consideration." This assurance put a stop for that time to any further investigation of the subject. But I do hope that all those members of both houses of Parliament who retain a respect for the memory of this departed minister, will, on recalling this positive assurance of his to their recollection, consider themselves bound to give their countenance and support to a measure which can boast such authority, and which is so well calculated to restore the wonted energies of the British people.

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The opinion of William Jackson, esq. one of His Majesty's Commissioners of Excise, on the proposed repeal of the salt-duties, is as follows:—

"Many of the advantages," says he, "which would result from a repeal of the duties on salt, and of the laws by which those duties are secured and collected, must be obvious. And, except as to the revenue, or the finding a direct substitute for the duty (upon which I dare not venture any opinion), it is presumed that no inconvenience could arise from such repeal, for which the wisdom of the Legislature would not be able to provide an adequate remedy."—*Second Report from the Committee on the Laws relating to Salt, printed 30th June* 1801. Page 22.

"It must astonish foreigners," says Sir Thomas Bernard, "that an immense *prohibitory* impost should be laid on an article of British produce, essentially necessary to our manufacturers, agriculturists, and fishermen; whilst Ireland and Scotland are burthened in a lesser degree, and Spain and the rest of the world are *entirely free*. Very different is this

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from the policy of ancient governments, recognised by the greatest and highest authority: 'Of whom do the kings of the earth take custom, or tribute? of their own children, or of strangers?'—'Of strangers.'—'THEN ARE THE CHILDREN FREE.' But with us and by our laws, the *strangers* are free; and the *children* are taxed to forty times the value.

"If we had shown the same want of wisdom with respect to our *coals*, that we have done with regard to our *salt*,—supplied foreigners with them duty free, and imposed a very heavy tax on home consumption,—we should have been a wretched, insignificant, and contemptible people: manufactures and commerce would have been almost unknown amongst us, and agriculture would have sympathized in the general depression. But, on the other hand, if we will act with regard to our SALT as wisely as we have done as to our COALS,—encourage the *profitable* use of it in arts and manufactures, and give to our countrymen the free and (as far as may be) the *exclusive* benefit of it,—all the advantages which this country has derived from the *free use of coals*, would be doubled by the *free use of salt*; and whenever we may think

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fit to favour other countries with a participation in this advantage, the imposition of a duty on *exported salt* would prevent the favour from being considered as wholly gratuitous."—*Sir Thomas Bernard's Letter to the Right Honorable Nicholas Vansittart, on the Salt-Laws*, p. 81.

"At the entrance of the town of Northwich, my attention," says Sir Thomas Bernard, "was attracted by rows of new houses, built on each side of the way. I complimented my conductor on the comforts which the labouring class appeared to enjoy here, and on the air of neatness and elegance which these buildings gave to the place. He told me these were *some* of the houses of officers of Excise; and on further inquiry added, that there were 120 resident excisemen at Northwich. With a feeling that these gentlemen were the *diseases* of the place, I exclaimed with Virgil—

'Vestibulum ante ipsum, primisque in faucibus Orci
Pallentes habitant morbi.'

"History has said a good deal about the *thirty tyrants of Athens*; but what are they compared with the hundred and twenty of Northwich? *Numerically*, I know nothing like

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them, except the '*one hundred and twenty* princes, which it pleased Darius the king to set over the province of Babylon.' I do not mean any personal disrespect to these gentlemen. It is not their behaviour, but their *existence*, that I object to; or, if they must exist, I think they would be much better employed in *catching fish*, than in preventing our having salt to *cure it*. What improvements can a man have the heart to attempt and perfect, or what experiments or investigations can he pursue with any spirit, when there are a *hundred-and-twenty* persons of different tempers and dispositions, living near him, each having the power to examine all his works every hour of the day; interrupt his processes by the discovery of some obsolete clause in some forgotten act of Parliament; and check his inquiries, and deprive him of the benefit of his skill and attention? This unceasing interference with all their operations has so damped and extinguished their talent and invention, that instead of wondering that our salt manufacturers have made so little use of our recent discoveries in chemistry, and in the application of fire, we should rather admire that they have not been been chained

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down to the old process of pouring brine on burning wood, and then raking the salt out of the ashes."—*Ibid.* page 42.

In another part of this interesting Letter to Mr. Vansittart, the worthy Baronet proceeds thus:—

"Let us," says he, "for a moment suppose the same duty of 30*l.* per ton were to be laid on COALS that is already imposed upon salt, with the same allowance of it, *duty free,* to foreign nations, *so as not to injure their manufacturers;* and let us try to anticipate the strength of argument, and vehemence of language, which would be applied to show the injustice and impolicy of such a tax. The claim of a royal fifth out of some mines has been thought oppressive. Yet what is a fifth? what would be *four-fifths* of the annual produce of a copper-mine, lead-mine, or any other mine, compared with a tax which prohibits the proprietor, under the severest and most rigorously exacted penalties, to apply *three penny-worth of his own salt* for the use of his family, until the sum of TEN SHILLINGS has been paid to the collector of excise *for permission* to use it?—Such how-

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ever is the law. Compared with this, the taking from him *nine-tenths* of his annual produce would be nothing. He would enjoy the remaining tenth freely.—What! after that he has raised his own property from the bowels of the earth, purified it, crystallized it, and fitted it for use, must he pay a fine of *forty times its value*, for permission to use it? No privation that does not take the whole, can be compared with such a tax."—*Ibid.* page 59.

A respectable merchant of Liverpool, a short time ago, published a very interesting pamphlet on the Laws relating to Salt, which he also addressed to Mr. Vansittart, and from which, with his permission, I copy the following sensible and impressive passages:—

"The distrest state of the labouring classes," says the writer of the pamphlet, "imperatively calls for effective and permanent relief; and I know not any concession so important and so grateful, which a minister could make to their wants, as a removal of the duty on salt. With salt no poor man can dispense: it is an essential article of his food; it is a necessary

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ingredient in all his meals; and to such an extent is this the case, that upon a moderate calculation it cannot be estimated *at less than three per cent. on his income.* The high price at which he receives this necessary article also operates most injuriously to his interests, by preventing him from laying up his store of salted provisions for the consumption of the winter, which is so necessary a piece of his domestic economy, and so essential to his comforts."—*Mr. Horne's Letter to the Right Honourable Nicholas Vansittart,* page 5.

"A bushel of salt," says the same writer, "weighing fifty-six pounds, may be obtained at the salt-works for sixpence; and for sixpence in addition, or less, it may be conveyed to any port in the United Kingdom. But when we consider that 3,000 per cent. is levied on the first cost, it ceases to be a matter of surprise that it has hitherto been so sparingly resorted to by agriculturists."—Page 6.

The same writer, having copied some useful observations from the Memoirs of the Royal Academy of Sciences at Paris, on the employ-

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ment of common salt as a manure for land, in several districts upon the Continent, adds, "But the use of salt in husbandry is not confined to France or Spain; all the kingdoms of the North of Europe, the United States of America, our West India possessions, the trading stations on the coast of Africa, all import largely from Great Britain; and the farmer, unrestrained in his operations, finds a profit in the use of our refined and rock salt, with all the heavy expenses attendant on transporting it from this country. The British agriculturist has the mortification to see himself deprived of a valuable article, which Nature so freely presents for his use. He not only witnesses his inability to resort to it, but at the same time sees it conveyed from his own to distant countries, where it affords to the farmer the means of successfully opposing him, not only in *foreign markets*, but often IN HIS OWN."—*Mr. Horne's Letter*, p. 15.

"The least important benefit," says Mr. Horne, "which the country would reap from the repeal of the duty, (meaning the increase of the salt-trade,) is in itself of no inconsiderable consequence; inasmuch as it would vastly ex-

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tend the manufacture of salt, benefiting in its operations the trade in iron, coals, bricks, &c. besides giving full employment to many thousand families now sparingly engaged in the various branches of the salt-trade; and requiring, from its additional operations, the assistance of a very numerous body of artisans and labourers.

"The distressed condition of the labourers employed in the Cheshire Salt-works was lately made known to His Majesty's ministers. The want of employment was not, however, merely attributed to the general stagnation of trade, but in no inconsiderable degree to the permission which exists to import foreign salt. This measure is so glaringly impolitic, that nothing can be adduced either in favour of its adoption or its continuance. It deprives the British manufacturer of a market for a very large quantity of his salt, it diminishes the employment of our coasting vessels; and in serving as a cloak for the introduction of contraband goods, it occasions a serious loss to the revenue."—*Mr. William Horne's Letter to the Right Honourable Nicholas Vansittart, on the Repeal of the Duty on Salt*, page 19.

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On Family Uses of Salt.

14. *Consumption by Housekeepers.* Page 37, line 10.

In the various conversations which have been held on the subject of the salt-duty by the persons who are most zealous in their endeavours to obtain its repeal, sufficient stress, I think, has not been laid on the increase in the domestic consumption of salt which would be occasioned by the removal of the duty. It appears to me, from the best attention which I have been able to bestow upon the subject, that the quantity of salt which would then be consumed by private families, from the cottager up to the superior classes, would at least be double what it is at present; though perhaps this increase would comparatively be the greatest by the indigent poor and by other persons in the subordinate walks of life. Whenever this measure shall take place, the small housekeeper who usually buys a pound of salt at a time, will buy fourteen pounds; and those in better circumstances who have been in the habit of buying a gallon of salt at once, will then purchase a

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bushel. The children of the poor will then be indulged with salt to their milk or to their oat-meal pottage;—the poor man will then eat three times as much salt to his potatoes as he does at present;—and the cottager who is not too indigent to be able now and then to purchase a joint of meat, would enjoy a portion of it to-day, and salt the remainder to be laid by as a luxury for a future occasion. The consequence of this would be, that our poor would be more healthy and independent; their comforts would be augmented; they would be more likely to be happy and contented in their sphere of life; and would not fail to bless the memories of those who had condescended thus to consider their lot, and had bestowed upon them so acceptable a boon.

On preparing Seed-corn.

15. *By Farmers, &c.* Page 37, line 20.

Having mentioned the use of a solution of common salt for preparing seed-wheat, to prevent the crop from being affected by the *smut*, and knowing that some people are very incre-

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dulous with respect to the salubrious effect that salt has upon the health of corn and other vegetables, I am desirous of mentioning a circumstance which comes within my own knowledge, and which in my opinion fully proves the fact; or at least that the farmers in the several counties surrounding the metropolis had found by experience, that it was prudent and economical to expend considerable sums in the purchase of salt for the purpose in question.

Ten or twelve years ago I was in the constant habit of buying from the salt-petre refiners the muriate of soda, (common salt,) which precipitates from the solutions of nitre in the process of refining. I bought these salts to decompose them for the sake of the mineral alkali, and I usually gave three pounds per ton for them. I soon learned, however, that the farmers in Kent and Surrey had applied for these salts to macerate their seed-wheat in, and in consequence of this the petre-refiners advanced the price of them to six pounds per ton. For some time I bought what I could obtain at this price; then I gave eight pounds per ton; and at last ten pounds per ton; when I was obliged to decline the purchase of them, in consequence of

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the farmers having offered the extravagant price of sixteen pounds per ton: and this price I believe they have ever since continued to give for them.

On the Abundance of Salt.

16. *Consumption by Agriculturists.* Page 38, line 7.

Lest an idea should be entertained that there might be some danger of a scarcity of salt, if this useful commodity should be employed in agriculture, &c. I copy the following short account of the salt-works at Droitwich in Worcestershire, from an author of undoubted credit. "Records of these salt-works," says Dr. Nash, "are traced from the year 816; they are mentioned in Domesday-book; and King John granted to the burgesses of the town whatever he had in the village of Wich, with the salt-pits and all their appurtenances, for the sum of 100*l.* sterling yearly.

"In 1725, the proprietors having understood from some persons concerned in the Cheshire salt-works, that the strongest brine there lay lower than the pits at Droitwich were com-

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monly dug, ordered the talc at the bottom of their pits to be sunk through: upon which, the strong brine burst up with such violence as to kill the two labourers then at work. Since this, such a profusion of brine has been obtained, that not a tenth part of it has ever been used, but has run to waste.

"In sinking these brine-pits, it is generally found to be about 35 feet to the talc; through the stratum of talc 150 feet; under the talc a river of brine 22 inches deep; and under this river a hard rock of salt. The talc is so hard, that the workmen never sink the pit through it; but bore a hole four inches in diameter, through which the brine rises and fills the pit*."

Under the grant of King John and several subsequent grants from the Crown, the proprietors of the old works monopolized the trade in salt, and prevented all persons in the neighbourhood from sinking any new pits. However, about the year 1690, Robert Steynor, esq. a gentleman possessed of more than 1000*l.* a year in landed estate, sunk a pit upon his own ground,

* See Dr. Nash's *Collections for the History of Worcestershire*, 2 vols. folio. London printed, 1781.

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and determined to try the right with the Corporation. This gentleman resolutely defended himself at an expense of more than six thousand pounds, and after various trials established his right; in consequence of which the monopoly was destroyed; the trade was greatly extended; and the price of salt was reduced from two shillings a bushel to four-pence.

I shall hardly be believed when I inform my readers that this gentleman was so reduced by the expenses of this litigation, and so entangled in law by his patriotic struggles for the public good, that he not only lost his whole estate, but the neighbourhood which he had so much benefited allowed him to end his days upon a parish allowance. A daughter of this gentleman was living twenty or thirty years ago at Droitwich on the same kind of support.

Besides the springs at Droitwich, which would alone be sufficient to supply the whole consumption of Great Britain, the salt-works at Namptwich, Middlewich, Northwich, and Winsford, in the county of Chester, are too well known to need any description. At Northwich there are mines of rock-salt of such an immense extent, that it is probable the constant

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working of them for some thousand years to come would not exhaust them.

As the salt-duty is likely to be repealed, it has occurred to me, that in this case it might be very advantageous to many individuals to find that there were salt springs in other parts of these kingdoms besides those already mentioned; and I do think that it would be a very acceptable present to the public, if some person of leisure would attempt to give a complete list of the places where such springs are to be found; that every person might take his salt from that spot which should be most contiguous to him. The only places of which I have myself met with an account are as follow.

There is a salt spring at East Chennock, in Somersetshire *, about twenty miles from the sea, and another at Leamington in Warwickshire †. Such a spring likewise runs into the river Cherwell in Oxfordshire ‡; and there are several more in Westmoreland and Yorkshire

* See Campbell's Political Survey of Great Britain. Philosophical Transactions, No. 56, page 1130.

† Camden's Britannia, vol. i. col. 599.

‡ Plot's Natural History of Oxfordshire, chap. ii. § 13.

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which ought to be remembered. At Borrowdale, near Grange, three miles from Keswick, in Cumberland, a pretty strong spring rises in a level, near a moss, sixteen gallons of the waters of which yield one gallon of pure salt*. At a place called Salt-water-haugh, near Butterby, in the bishopric of Durham, there are a multitude of salt springs, which rise in the midst of the river Weare, for the space of about forty yards in length and ten in breadth; but particularly one out of a rock, which is so strong, that in a hot summer's day the surface will be covered with a pure white salt†. At Weston, in Staffordshire, there are brine pits which afford about a ninth part in measure of pure salt. There are others at Enson St. Thomas, and in the parish of Ingestre; and it is believed that, by boring lower, stronger springs might be found in the neighbourhood‡. In Lancashire there are several salt springs §, especially

* Short's History of Mineral Waters, p. 85.

† Philosophical Transactions, No. clxiii. p. 726. Childrey's Britannia Baconica, p. 165.

‡ Plot's Natural History of Staffordshire, chap. ii. § 103. 112.

§ Short's History of Mineral Waters, p. 85.

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that of Barton, which is as rich as the spring at Northwich.

Not only Great Britain, but many other nations of the world enjoy this valuable production of nature in abundance. Some years ago an American friend wrote me word that there had lately been discovered a mountain of rock-salt in Louisiana, one hundred and eighty miles long, forty-five miles wide, and of a very considerable height, the surface of which is barely covered with earth, and not a tree or a shrub growing upon it.

The salt-mines near Cracow, in Poland, are of immense extent, and are visited by travellers as one of the greatest curiosities in the world. Eight hundred workmen are constantly employed in this mine; and Nature, ever provident, has contrived that a stream of *fresh water*, pure and transparent, should constantly flow through it. This is received into wooden troughs, for the use of the horses, the workmen, and the inhabitants of the town which has been erected within this singular subterranean cavern.

"Thus cavern'd round in Cracow's mighty mines,
With crystal walls a gorgeous city shines;

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Scoop'd in the briny rock long streets extend
Their hoary course, and glittering domes ascend;
Down the bright steeps emerging into day,
Impetuous fountains burst their headlong way,
O'er milk-white vales in ivory channels spread,
And wandering seek their subterraneous bed.
Form'd in pellucid salt with chisel nice,
The pale lamp glimmering through the sculptured ice,
With wild reverted eyes fair LOTTA * stands,
And spreads to Heaven, in vain, her glassy hands;
Cold dews condense upon her pearly breast,
And the big tear rolls lucid down her breast."

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* Within the immense salt-mines of Cracow in Poland, there is actually a town with a market-place, a river, and a church: in the midst of the market-place is a famous statue of immense size beautifully sculptured out of the rock salt; by the moist or dry appearance of which, the subterranean inhabitants are said to know when the weather is fair above ground. The galleries in these mines are so numerous and so intricate, that workmen have frequently lost their way, their lights having been burnt out, and have perished before they could be found. And though the arches of these different stories of galleries are boldly executed, yet they are not dangerous; as they are held together or supported by large masses of timber of a foot square; and these vast timbers remain perfectly sound for many centuries, while all other pillars, whether of brick, cement, or salt, soon dissolve or moulder away.

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On Salt in Horticulture.

17. *Used by Gardeners.* Page 41, line 8.

The late Mr. Hitt, who was gardener to Lord Robert Manners, and also to Lord Robert Bertie, at Chislehurst in Kent, and who published a very sensible and modest Treatise on Fruit Trees, has made the following observations on the use of salt for manuring land and for purposes of horticulture.

"To show an acquaintance of mine," says he, "the effects and advantages of salt properly applied to vegetables, I made the following experiment, in an extreme dry summer, upon a bare piece of pasture land, out of which the cattle were all taken for want of grass. I marked four places with stakes, each of which I watered nine nights successively in the following manner: the first with spring water alone, to the quantity of a gallon; the second with the same quantity of water, adding an ounce of common salt; the third and fourth with the same quantity, mixing the water in the third place with two ounces of salt, and that in the

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fourth with three ounces, which produced the following different effects.

"The grass in the second place grew more and of a darker green than that in the first; in the third it only grew by spots, for part of it was killed where the greatest quantity of water fell; and the fourth was quite brown for a greater compass than the third: by which it appeared, that an ounce of common salt in a gallon of water had a better effect than the water had alone; and that three ounces of salt mixed with a gallon of water was more than the grass could immediately receive; but the fourth place in the ensuing spring was the most fertile of them all."—Page 17.

On the effects of salt upon fruit-trees the same author has the following remarks:—"The honey-dew," says he, "is a glutinous substance, very prejudicial to many kinds of fruit-trees; for it contracts the minute vessels of their most tender parts, and prevents their imbibing and perspiring such fluids as are required in vegetable life.

"A few days before the honey-dew appears, you may discover small insects, on the underside of the leaves that are shrivelled, almost

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without motion; yet the heat of one fine day will make them visibly increase, both in bulk and strength, and likewise more in number.

"If the season be wet, spread common salt all over the border, about eight ounces to each tree; for the more salts the juices contain which form the young branches, the more compact and smooth their leaves will be, and thereby less subject to the penetration of the honey-dews.

"If the fly be strong, double the quantity of salt before directed, and water the bottom of every tree before the soot or lime is laid on at the time of trenching.

"I have found these methods successful, even when the flies have been very strong upon the trees, and have in a few days destroyed many of them, and caused the trees to shoot vigorously.

"The ants are much complained of for destroying fruit and leaves; but when borders are rightly prepared and ordered, they cannot live.

"Against old walls either of brick or stone they are the most troublesome; for, as they lodge in the nail-holes, the watering of the borders only has no effect upon them: but the walls should

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be watered all over with two ounces of salt to a gallon of water."—*Hitt's Treatise on Fruit-Trees.* Third edition, octavo. London, 1768, page 273 &c.

I have also understood, from what I deem good authority, that it has long been a practice in the cider counties, for those gentlemen who are ambitious of having fine orchards, to dig a small trench a few yards distant from each apple-tree, and place within it a few pounds of common salt; that this, by means of the rain, becomes gradually conveyed to the roots of the tree, and produces the most desirable effects. Within the remembrance of many persons now living, the apples of England have very much degenerated: but whether the universal use of salt in the orchards of the counties of Hereford and Devon, in consequence of the repeal of the salt-laws, would restore the original quality and quantity, I am not horticulturist sufficient to form a decided opinion.

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On Salt in Agriculture.

18. *For Manuring Land.* Page 53, line 16.

Some persons who object* to the repeal of the duty upon salt have urged, that it is impossible salt can be beneficial for any purpose of agriculture, from the circumstance of the allusions to its effect upon land which are to be found in the sacred writings. Let the passages, however, in which these allusions occur be examined, and I think it will be found that they do not warrant such a conclusion. "The

* At first sight it may appear extraordinary that any person should object to the repeal of laws which are so extremely baneful and oppressive as those are which relate to salt: but I have been credibly informed, and I think it my duty to apprize the public of the circumstance, that there are some individuals of great opulence, weight, and consequence, whose private interest is so interwoven with the continuance of the present system, that they are exerting their whole influence to baffle the attempts of those who are now exerting themselves to obtain the repeal.—It will not be expected from me that I should explain the motives of these gentlemen; especially as there are numerous persons in the county of Chester, and also at Droitwich, who can easily unravel the mystery.

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whole land thereof is brimstone and *salt* and burning; it is not sown, nor beareth, nor any grass groweth therein, like the overthrow of Sodom." Deuteronomy xxix. 23.—"And Abimelech beat down the city and sowed it with *salt*." Judges ix. 45.—"He shall inhabit the parched places in the wilderness, in a *salt* land." Jeremiah xvii. 6.—"Moab shall be as Sodom, and the children of Ammon as Gomorrah, even the breeding of nettles, and *salt-pits* and a perpetual desolation." Zephaniah ii. 9.—Now what do these passages amount to? Can they be considered by any rational critic to be any more than strong symbolical representations of desolation; and that owing to the desertion of the said places the land would become uncultivated, and as unproductive as that surrounding Sodom, which is overflowed with the salt water of its own lake?

Although I had never any doubt as to the meaning of these passages, I have just now had the curiosity, for my own satisfaction, to look into Maundrel's Journey from Aleppo to Jerusalem, to see what he says respecting the Lake of Sodom, and shall transcribe his relation. "The water of the Lake," says he, "was very limpid,

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and *salt* to the highest degree; and not only salt, but also extremely bitter and nauseous."—Oxford edition, page 84.

Now what is it which those passages of Holy Writ have a tendency to prove? Is it not, that the sacred writers were acquainted with the deteriorating quality of salt when applied in large quantities to land; and that the circumstance which is exemplified in our own country by the overflow of the salt-pits, was familiar to them; and that they well knew that wherever land is deluged with salt water, such land will not only be diminished in value, but will even become absolutely steril?

We are not, however, to imagine from the passages in question that the inhabitants of Palestine were ignorant of the fertilizing property of common salt when applied with prudence and in due quantity. Indeed we have a direct testimony to the contrary. The wisest teacher that ever instructed mankind addressed his immediate disciples with this language: "YE ARE THE *SALT* OF THE EARTH:"—intimating, that by their example and instruction they would be able, notwithstanding the meanness of their origin and the smallness of their num-

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bers, to produce a change upon the moral condition of mankind, equally extraordinary with the fertilizing effect which was well known to be produced in the natural world, by a small portion of common salt carefully and judiciously distributed.

Flattering myself that I have now removed the objection which has been attempted to be raised against the repeal of the salt-laws from the sacred volume, I shall in the next place proceed to adduce such authority for the modern use of common salt in agriculture as appears to me to deserve consideration.

Dr. Holland, in his Agricultural Survey of the County of Chester, has clearly shown the good effects resulting from the use of salt on grass-lands, and also as a manure for wheat and barley. Among other instances he relates the following:

"After draining," says he, "a piece of sour rushy ground about the middle of October, some refuse salt was spread upon a part of the land, after the rate of eight bushels to the acre, and in another part sixteen bushels. In a short time the vegetation disappeared totally, and

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during the month of April following not a blade of grass was to be seen. In the latter end of the month of May a most flourishing crop of rich grass made its appearance on that part where the eight bushels had been laid. In the month of July the other portion produced a still stronger crop; the cattle were remarkably fond of it; and during the whole ensuing winter (which is ten or twelve years since) and to this day, the land retained, and yet exhibits, a superior verdure to the neighbouring closes."—*Dr. Holland's Survey of Cheshire.*

Dr. Darwin, in treating of salt as a manure, observes, That it is a stimulus which excites the vegetable absorbent vessels into greater action than usual; and in a certain quantity it increases their growth, by enabling them to take up more nourishment in a given time, and consequently to perform their circulations and secretions with greater energy.

The late Thomas Butterworth Bayley, esq. who was a Fellow of the Royal Society and Honorary Member of the Board of Agriculture

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in London, in his Thoughts on Manures, after enumerating nineteen different substances which improve land, adds, "There is another source of improvement LOST TO THE COUNTRY, but *not through the fault of the farmers*, viz. refuse rock-salt, and refuse liquor from the salt-works. I trust the very impolitic restriction which forbids the use of this valuable manure, and causes its *total loss*, will soon be removed by the exertions of this Society and those of the Honourable Board of Agriculture."—*From an Address read to the Members of the Agricultural Society of Manchester, October 22, 1795.*

The Earl of Dundonald has suggested the following important considerations on the use of sea-water as a manure for land. "In the vicinity of the sea, farmers and others," says he, "may avail themselves of their situation and procure sea-water either to mix with dung, or for the other purposes to which the application of it has been recommended. A ton of sea-water contains from a bushel to a bushel and a quarter of sea-salt, beside a certain portion of the vitriolic salts.

"Sea-water may be raised where coal is

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cheap, by means of a fire-engine, to such a height as, corresponding with the level of the inland country, would allow the water to be conveyed in small open canals, in wooden or in earthen pipes, to a considerable inland distance; each farmer or proprietor receiving as it passes the necessary supply.

"A fire-engine of forty inches cylinder, with ten-inch pumps, would raise to the height of thirty fathoms 1000 tons of water per day, equal to 6000 tons per week, or 300,000 per annum. Admitting this water to contain 1 in 33 of salt, 9,636 tons would annually be procured; and supposing each farmer, on an average, to receive such a quantity of sea-water as would be equivalent to 33 tons of salt, 9,636 tons would be sufficient to supply 292 farms. Should the interest of the capital employed, and the charges attendant on the fire-engine, amount to 500*l.* a year, which is an abundant allowance where coal is cheap, and should the further interest on the sum engaged in conveying the water to distant places amount to 500*l.* more, the total expense for raising, conveying, and serving 292 farms with sea-water, would amount to 1000*l.* per annum, or

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something less than 3*l.* 10*s.* for 33 tons of salt, contained in the sea-water which each farm would receive.

"Admitting, however, that the expense of the fire-engine and of conveying the water were to be double the sum above stated, and that instead of 3*l.* 10*s.* it were to amount to 7*l.*, a quantity of salt-water containing one ton of salt would in this latter case cost the farmer only 4*s.* 3*d.*, or at the rate of one penny farthing per bushel of salt of 56 pounds."—*Earl of Dundonald's Treatise on Agriculture.* Quarto. London 1803, page 124—126.

"The late Lord Coventry used to have a regular supply of this manure sent from Droitwich to his place at Crome Court, the excise officer attending to see it removed and laid on the land, and receiving a compliment for his extra attendance."—*Sir Thomas Bernard's Letter to Mr. Vansittart,* page 10.

"It is understood that a considerable part of the salt which we export *duty free* to America is used for the purposes of agriculture; though by the time it reaches the American farmer it

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costs him as much as two shillings and sixpence a bushel."—*Ibid.* page 15.

In looking over an act of parliament, entitled "An Act for transferring the Management of the Salt-Duties to the Commissioners of Excise," dated 28th June 1798, the time when the duty was raised from 10*l.* to 20*l.* per ton; I found a clause which so clearly and explicitly declares that the farmers had been in the practice of using salt in manure for land, that I am induced to copy the whole section, which runs thus:—

"And whereas it sometimes happens that part of the salt employed in curing fish, after having been repeatedly applied to the fish, becomes so foul as to be entirely unfit for that purpose, which salt hath heretofore in certain places and under certain restrictions been used in the *manuring of land*,—be it therefore enacted, That it shall be lawful for the Lords Commissioners of His Majesty's Treasury, or the major part of them for the time being, by special warrant or warrants under their hands, *upon such terms and conditions, and, under, subject, and according to such rules, regulations and*

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restrictions, as they shall judge expedient, to authorize the Commissioners of Excise to permit any entered fish-curers residing at places where, immediately before the passing of this act, foul fishery salt was allowed to be sold for manuring land, *to sell such of their fishery salt for the sole purpose of manuring land,* as, from having been repeatedly applied to and used in the salting and curing of fish, shall have become so foul and impure, as to be utterly unfit to be again used in, or applied to, the purpose of salting or curing fish: provided always, That if any person, whether a fish-curer or not, shall be convicted before any one of His Majesty's justices of the peace residing near to the place where the offence shall or may be committed, of wilfully and knowingly selling, disposing of, or using any such foul fishery salt, or of suffering any such foul fishery salt to be sold, disposed of, or used, for any other purpose than that of manuring land, or of selling, or disposing of, or using any salt for the purpose of manuring land, except such salt as by such repeated use and application as aforesaid shall have become so foul, dirty, and impure, as to be totally unfit to be used or employed in salt-

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ing or curing fish, every such person shall, for every such offence, forfeit and lose the sum of one hundred pounds, and shall for ever afterwards be excluded from the privilege or benefit of selling or using any foul fishery salt for manuring land, any thing in this act to the contrary in any wise notwithstanding."—*Act* 38 *Geo.* III. *cap.* 89, *sect.* 106, *page* 862.

Soon after I had seen this clause, I accidentally met with a respectable merchant from Liverpool, to whom I mentioned the circumstance; and he assures me, that the large curers of fish at that port have contracted with the farmers in their vicinity to take all the waste salt which is produced in their establishments, at twenty shillings per ton; and that such salt is at this time disposed of at that price, for the purpose above mentioned.

Some years ago the Earl of Dundonald, who was anxious to obtain the repeal of the salt-duty, drew up a list of articles to be submitted for taxation in lieu of salt. At the bottom of the schedule he adds the following observation.

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"The preceding statement," says he, "does not include the duty on rock-salt employed either in the state of salt, or when prepared into *Glauber salt* or *mineral alkali, as a manure,* and which can be afforded to be done, paying a duty of thirty shillings per ton. The consumption *for this purpose* may probably in a few years, when the benefit from the use of salt, or the saline substances prepared from it (*as a manure*) is generally known, amount at the most moderate calculation to FIVE TIMES *the quantity of salt* consumed in Britain FOR ALL OTHER PURPOSES."—Copied from *Earl Dundonald's Evidence before a Committee of the House of Commons in the year* 1801.

Although sufficient evidence has, I presume, been already given to prove the efficacy of common salt in promoting vegetation, I could not resist the inclination which I felt to treat my readers with the following impressive expostulation from the pen of an eminent and noble British senator:

"The science of agriculture," says he, "is by no means at its height; and in the almost miraculous advance of chemistry, new means

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may be found from the concentration of known composts, and the discovery of new, to lessen the cost of culture, and to increase its returns. But here again your Revenue stalks like a ghost across my path, whichever way I turn; as otherwise you have a superior unbounded source of improvement trodden under your very feet, and cast as refuse into your rivers, beyond all that chemistry is ever likely to discover. You have SALT in endless abundance, but your *necessity* turns it into *money*, even to forty times its value, instead of spreading it abroad for various uses, to rise up in property which no money could purchase.

"After thus taxing to the very bone, this life's blood of your people, why, to be consistent, do you not bind up by law their veins and arteries to prevent circulation? Do you know what salt alone would do for you, if it were not seized upon as a revenue, and clung to, perhaps as a plank which you cannot quit in your distress? I will speak of its other uses hereafter; but can you be so ignorant as not to know, that by taking the tax upon it *directly as money*, you rob yourself of fifty times its amount in the productions of your soil; in

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your fisheries and manufactures; and in the universal prosperity of the country?

"Lime, which has caused to start into life the most inert and steril parts of Great Britain, is just nothing as a manure, when compared with SALT, which differs from it besides in two remarkable qualities, decisive of its superior value.

"Lime, and I believe all other known composts, are powerful only according to the quantities in which they are used; whereas salt, to be useful, must be sparingly applied; it *corrupts* vegetable substances when mixed with them in *small* quantities, but *preserves* them when it *predominates in a mass*. It is needless therefore to add, that, independently of its comparative lightness, the expense both of the article and its carriage must be very greatly diminished. Yet you rob the mother of your people of this food which indulgent Nature has cast into her lap, sufficient, as you will see hereafter, to feed all her children, even if their numbers were doubled.

"Nothing, indeed, can so clearly expose the infinite danger of public profusion, as the necessity it imposes upon almost all governments,

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of direct taxation upon articles of universal and indispensable consumption; such revenues are undoubtedly always great, and in moderation are therefore the best: but when they are pushed beyond the mark, which an enlightened view of the whole concerns of a country would make manifest to a great statesman, the advantages obtained are countervailed and become nothing; because they dry up other sources of wealth and improvement which would carry even great burthens, whilst the national prosperity was preserved.

"To continue this momentous subject, be assured that the very being of your country, *above all at this moment*, depends upon your making *your own soil* support your most extended population; and that to consider population as an evil, is to be wiser than God, who commanded man to increase and multiply, and who, I am persuaded, throughout all creation, has ordained that nothing should go backward or stand still."—*Armata*, page 169-172.

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On the Use of Salt for Horses, Sheep, and Cattle.

19. *Salt for graminivorous Animals.* Page 54, line 6.

On this subject volumes of evidence might be collected, but I trust that the few following extracts will be sufficient to convince the candid and unprejudiced reader.

"There is a custom in Spain and Portugal," says Sir Thomas Bernard, "which I have personally witnessed the practice of in North America, of daily placing on stones in the sheep pastures, some dry salt for the use of the sheep. I have seen each of the sheep in their turn, and with eagerness, take a small portion of it. This is considered as a preservative against the *rot*, and as contributing to their general health and good condition. In Spain the *cows* are regularly supplied with a little salt; and the increase of their milk, and the benefit which stable-fed cattle derive from it, are confirmed by many authorities. A Cheshire gentleman informs me, that when he wants extraordinary exertion from his horses, he always gives them

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a little salt; and this is analogous to the practice in the East, where the camels are allowed salt during the passage of the caravans over the Desert to Alexandria, as a support in the extreme fatigue which they undergo."—*Sir Thomas Bernard's Letter to Mr. Vansittart*, page 15.

Dr. Anderson, whose testimony will have great weight with every enlightened agriculturist, says: "There is no substance yet known which is so much relished by the whole order of graminivorous animals, as common salt. The wild creatures of the Desert are so fond of it, that wherever they discover a bank of earth impregnated with a small portion of salt, they come to it regularly ever after to lick the saline earth. It is also admitted by all who have tried the experiment, that salt given along with the food of domestic animals (except fowls) tends very much to promote their health, and accelerate their fattening; and although some persons, who have been at a loss to account for the manner in which this stimulant could act as a nutritious substance, have affected to disregard the fact, yet no one has been able to

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bring the slightest show of evidence to invalidate the strong proofs which have been adduced in support of it. It is not, therefore, an extraordinary position, to say, that by a proper use of common salt, the same quantity of forage might, on many occasions, be made to go *twice as far* as it could have done in feeding animals, had the salt been withheld from them. If so,—then we have here laid open to our view an easy mode of augmenting the produce of our fields to an amazing extent; for, if the same quantity of forage can be made to go, not twice as far, but $\frac{1}{10}$th part only further than it now does, it would be the same thing as adding $\frac{1}{10}$th part to the aggregate produce of meat for beasts throughout the whole kingdom."

To the beneficial use of salt upon cattle in augmenting the quantity and improving the quality of their milk, and of the cheese which it produces, we have a testimony of eighteen hundred years standing:

"Pecudes, armentaque et jumenta SALE maxime solicitantur ad *pastum*, multo largiore *lacte*, multoque gratiore etiam in *caseo* dote."—*Plin.* lib. xxxi. cap. 7.

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From a Memoir by M. Villar concerning the disorder among the cattle at Champsaur in the province of Dauphiné, I extract the following observations:

"The mortality," says M. Villar, "has increased in our fields since the augmentation of the price of salt has obliged the farmers to give it more sparingly to the cattle. In the district of Champsaur, and the adjacent countries, we are accustomed to give to every ox and cow four ounces of salt every eight days, and about an ounce to every sheep and goat at the same intervals. When this practice is neglected, the animals eat less; they lose their spirits; their hair rises; they go licking in the stalls the bottom of the walls where the salt-petre is formed; they grow lean, become barren, and disease ensues."—*History of the Royal Society of Medicine at Paris,* for the years 1777 and 1778. Quarto, Paris printed 1780.

"That *sheep* are fond of salt is beyond all doubt; it is equally certain that to these animals it is a preservative against many diseases, and, if I am not greatly mistaken, contributes.

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in no small degree to render their wool finer." —*Landt's Description of the Ferro Islands.* London, 1810.

Pliny the naturalist, whom I have before quoted respecting the use of salt on cattle in increasing their milk, was also acquainted with the medicinal effect of salt upon the health of sheep; for, still speaking of the uses of salt, he adds:

"Pecorum quoque *scabiem* et boum illitus tollit. Daturque lingendus."—*Plin.* lib. xxxi. cap. 9.

"The Onondargo, situated in the state of New York, is a fine lake of brackish water, surrounded by springs, from two to five hundred gallons of the water of which make a bushel of salt—all the animals of these parts have a great fondness for salt. The cattle of farmers who give this substance to their stock prove superior in value by 25 per cent. to such as are not supplied with an article so essential not only to their general improvement, but their health. The native animals of the country too, as the buffalo, elk,

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deer, &c. are well known to pay periodical visits to the saline springs and lakes, bathing and washing in them, and drinking the water till they are hardly able to move from the vicinity."—*Ashe's Travels in America*, vol. i. p. 95.

In the Memoirs of the Royal Academy of Sciences at Paris, is a Paper on the use of Salt for Cattle, an abridgement of which is published in the 24th volume of the Annals of Agriculture, and is as follows. It was communicated to Arthur Young, esq. by a correspondent, in the following manner:

"In looking over the Memoirs of the Royal Academy of Sciences at Paris, I met," says he, "with a paper entitled '*Physical Observations on the Effect of Salt in fattening Cattle.*' The title excited my curiosity; and on reading the memoir, the author's reasoning appeared to me not only plausible, but convincing. His views are certainly enlarged, and directed to objects of the most important kind, viz. the improvement of land and the increase of cattle. He lays it down as an axiom, or self-evident truth, that by increasing cattle, land may be improved; and by improving land, cattle may be multiplied.

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"The farmer," he says, "who has more than an ordinary stock of working cattle, reaps a double advantage: the one, by having his work done in season; the other, by enriching a greater portion of his land by means of their additional manure. The only difficulty is, how to maintain an increased number without increasing the expense: this, he asserts, may be done by the USE OF SALT, and advances the three following propositions:

"1. That salt given with the food of cattle, augments the nourishment of that food.—2. That in proportion to the quantity of salt eaten by cattle, the effects of that augmentation will be perceivable.—3. That no ill consequence will follow from excess of salt eaten by cattle, even though it should be given them without stint. These propositions he endeavours to support by unquestionable facts.

"In the jurisdiction of Arles, in the county of Provence, there is," he says, "a district called the Crau, extending in length about six leagues and in breadth about three, the whole surface of which is covered with small rough stones, and not a tree or bush is to be seen in the whole district, except here and there upon the borders; yet on this spot so seemingly steril, by

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the free use of salt, more numerous flocks of sheep are bred and reared than upon any other common of equal extent throughout the whole kingdom; and what is not less remarkable, the sheep are healthier, hardier, and endure the severity of the winter with less loss, though they have fewer sheep cots for covering, than those fed and bred on more copious pastures, and that have besides the advantage of more convenient shelter. Add to this, that the wool of the flocks bred and brought up in the Crau is not only the finest in the whole country, but bears the highest price of any in France. From hence he concludes, that it is to the unlimited use of salt that these surprising effects are to be ascribed; for it frequently happens that the Crau is so burnt up in the summer, that the poor animals are forced to turn up the very stones to come at the few blades of grass that grow round them, and yet none perish for want of food. Let every excellence, therefore, that can reasonably be supposed inherent in the herbage be allowed to it; yet the quantity of it is so small, that, without the abundant use of salt, a *fourth part* of the sheep kept in the Crau could not subsist on it.

"Having proved his first proposition incon-

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trovertibly, he proceeds to prove the second, by recommending an easy experiment, which it is in every farmer's power to make, and that is, to give one half of his cattle salt, and to the other half none: by this simple trial, he says, in less than a month the difference will be discernible; the cattle to which the salt is given will show it in their looks, in the sleekness of their coats, in their growth, and in their strength and firmness of labour. He adds, that with little more than half their usual food, all these effects will be produced. To establish his third proposition, he appeals to the practice about Arles, where the cattle have as much salt as they will eat, and none are so healthy, or thrive so fast, as those that eat most of it.

"To the above observations of our correspondent," adds Mr. Young, "we may state, that in Spain, where the finest wool in the world is produced, great quantities of salt are given to the sheep; to which they attribute, in a great measure, the *fineness* of the wool. The salt is laid upon the rocks, and the sheep who come and lick it are exceedingly fond of it."

It is extremely probable that the ancient Greeks and Romans were in the habit of giving

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salt to their cattle, with a design similar to that of the present European farmers. As a proof of this, read the motto to this volume from Virgil, of which the following is Mr. Dryden's translation :

" If milk be thy design ; with plenteous hand
Bring clover grass ; and from the marshy land,
Salt herbage for the foddering-rack provide,
To fill their bags, and swell their milky tide :
These raise their thirst, and to the taste restore
The savour of the salt, on which they fed before."

Dryden's Virgil.

The following is an extract from an Address to the Board of Agriculture by Lord Somerville, late President of the Board, on the Uses of Salt, when given to sheep and cattle :—

" We are not aware," says his Lordship, " that the practice of giving salt in its raw state, is to be found any where in this kingdom, except on our own estate. We shall, therefore, speak with due caution on the subject, confining ourselves to what has actually been done, and to the effect which, in several years trial, has been most apparent. The heavy duty now imposed on salt, seems to be sufficient to deter

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others from its use, as it for some time deterred us. At length, we fortunately lost sight of this timidity; our motive was not to produce this or that imaginary effect, but to keep sheep in health. It was reasonable to conjecture, that the flock would demand more salt in the autumn and spring months, when dews are heavy, than in the summer, or dead winter months; and so it proves.

"In Spain, a thousand sheep use in five months four arobes or one quintal of salt, which is 128lbs. Their sheep would fat to about 13lbs. per quarter upon the average. This is the quantity given out, all of which may not be consumed, and as the price of salt in that country is no object, more would have been given if more was necessary. Without reference to what was allowed in Spain, (for the increased moisture of our climate, and the peculiar properties of our various soils, would not allow such a reference safely to be had,) the quantity given to our sheep was such as we have before stated would keep them healthy, or such as they appeared to demand. It is given in the morning when the sheep are looked over, in order to counteract the ill effect of the dew. They have consumed

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at the rate of one ton of salt for every thousand sheep annually, amounting to 26*l.* sterling: the consumption of one thousand sheep might occasionally, but varying according to the season, amount to 30*l.* sterling per annum, and no more. A small handful is put on a flat stone, or slate, and ten or fifteen of these slates set a few yards apart, are enough for one hundred sheep: at first the sheep may be moved towards them; if they feel a craving for salt, they will lick up quickly as much as is necessary; if they do not want it, what remains dry when the sheep are next looked at, is taken up and reserved for future use. Twice a week has been usually found sufficient; in particular cases it may be offered thrice.

"As to any doubt respecting their inclination to it, none can be maintained; for, of a flock approaching to one thousand, there are not ten old sheep which have not taken kindly to it, and not a lamb which does not consume it greedily. When turnips, in the early season, are stocked with sheep, and the greens are rank and strong, many die suddenly, more especially young two-tooth sheep. The disorder is a pent-up wind, occasioned by excess of fermen-

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lation in the stomach; here salted hay, and salt, are devoured with a greediness that denotes their salutary effect. The autumn of 1801 was rainy and unfavourable, yet *we did not lose one sheep* in turnips, and probably *never shall* whilst we persevere in the use of salt. In that of 1802, we had many hundred fat wethers, gales, and hog-sheep in turnips, and lost two the first month the turnips were stocked; certainly the chances were, that in any keep and any season, of such a flock more might have died. In strong pastures likewise, when seasons are wet, the rot often spreads destruction over whole tracts of country;—here salt must be beneficial, and an object of NATIONAL importance. It is supposed, and with great truth, to correct acidity in the stomach, a disorder common to sheep even in Spain, but of a much more serious nature in the damp climate of Great Britain; more particularly when stocked on green floaty food, such as turnips, vetches, and young clover.

"Salt may not be an absolute specific on land naturally unsound; such land it is madness at any rate to stock with sheep: but where the rot occasionally prevails, those who have care-

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fully noted how salt affects cattle, can hazard little in supposing, that the disease will be much less heard of when such a corrective is applied. We must content ourselves rather with a negative than positive proof, because it is not easy to ascertain how many sheep *might* have fallen sick, or have died, which are now in health and alive; but it may be put to any flock-master, whether he would not consider himself a fortunate man, if at the expense of thirty pounds sterling per annum, he could materially improve the health and condition of a flock of one thousand sheep weighing fourteen pounds per quarter. His probable answer will be, that he would give double the money to secure to himself such an advantage.

"We are all sensible of the effect of salt on the human body; we are told how unwholesome, and we know how unpalatable, fresh meat and vegetables are without it. The ancients held it in the highest estimation. '*Omnis mensa malè ponitur absque sale.*' We also know the avidity with which animals in a wild state seek the salt-pans of Africa and America, and the difficulties they will encounter to reach them: this cannot arise from accident, or caprice, but

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from a powerful instinct within, which, beyond control, compels them to seek at all risks that which is salubrious.

"In Holland, the ancient laws ordained men to be kept on bread alone, *unmixed with salt*, as the severest punishment that could be inflicted in their moist climate: the effect was horrible; these wretched criminals are said to have been devoured with worms engendered in their own stomachs. In Germany, we are told by Count Rumford that salt is universally given to oxen and cows in a fatting state, and that their proof is proportionate to the quantity given.

"In Sweden, in Saxony, in Silesia, and in France, salt is given to sheep: it is considered a most important article, and is strongly recommended. M. Daubenton says '*Le sel leur donne l'appétit, et de la vigueur; il les réchauffe, et les fait digérer; il empêche les obstructions, et il fait couler les eaux superflues, qui sont la cause de la plupart de leurs maladies.*' 'They want it most,' he says, 'when they are languid and out of order, which happens in fogs, in heavy rains and snow.'

"It is well known that hay, mouldy from

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rain, is rendered palatable and remarkably nutritious to cattle, by simply strewing salt on the stack, at the rate of ten or fifteen pounds per ton, when making: equally notorious is it, that a sensible effect is hereby produced to the taste; that cattle will prefer it to better hay, well put together, and will demand, when fed on it, without injury to themselves, three times as much water; which circumstance alone accounts for that aptitude to fatten which is conspicuous in hay so salted. It remains to be proved how good hay which had not spent its strength in premature fermentation, would bear such a quantity of salt as would invigorate the stomach, quicken the circulation of the blood, and excite in cattle a desire to drink largely: that it does bear it, and that the effect this hay has upon stock almost surpasses belief, WE HAVE ASCERTAINED.

"Some of our hay, lately in use, was of the first quality of sheep hay, the produce of rich and deep loam on a limestone bottom; it was put together without wet, and had twenty-five pounds of salt per ton sprinkled through a sieve, a greater quantity than has yet been used. In colour, flavour, and proof, it equalled any

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hay whatever; and satisfies us, that this or a greater quantity of salt may be infused into hay of the best quality, and with the best possible effect.

"In confirmation of these facts, we have also the authority of Mr. Darke of Breedon, one of the most celebrated graziers in the kingdom, who has mixed salt with his flooded, mouldy hay, eight pounds of salt only to a ton, and declares that his Hereford oxen did better on it than others on the best hay he had, and that he was and is convinced, that the hay had all its good effect from the salt.

"Salt cannot be conveyed into the animal in a more effectual manner, than by sprinkling it on hay through a sieve, when in the act of putting together; *for every particle is imbibed* in the fermentation, without a possibility of waste. It will upon trial, no doubt, prove a better breakfast than those cold dews which prevail in this country nine months out of the twelve; and which are more prejudicial to the wool and carcase of those feeble animals, than has been hitherto considered."—*Lord Somerville's Address, copied from the Communications to the Board of Agriculture,* vol. ii. page 470.

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On the British Fisheries.

20. *Extension of the Fisheries.* Page 56, line 7.

A noble Lord who has lately published an instructive little volume on political economy has the following observation:

"Our fish are prolific beyond all other creatures, and are bound to an appointed course. The finger of God, visible as it is throughout all his works, seems here to be more distinct and manifest; pointing with a benevolent clearness to this inexhaustible source of food. The supply has been always a great national object: *but improvement has not reached its height,* and never can reach it whilst a most improvident and enormous duty upon salt, amounting to thirty times and upwards of the value of the commodity, is suffered to remain as it is at present."—*Armata,* page 141.

On the means which we naturally possess for the increase of our fisheries, Sir John Sinclair, bart. has the following striking remarks:

"The great advantage," says he, "which

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Nature has given us for maritime power, in consequence of the variety of fish with which our seas abound, need not be strongly insisted upon. It is indeed universally acknowledged, that there is no part of the world where such quantities are to be met with at every season of the year, better calculated either for the purposes of maintaining the inhabitants of the kingdom, or of serving as a lucrative branch of commerce with other powers, or for raising a valuable addition to the number of our seamen.

"Foreign commerce is undoubtedly a great source of naval strength; and Great Britain, it is certain, enjoys that advantage to as great, if not a greater extent than any other power in Europe.—But the trade carried on along the coasts of the island is of a more permanent and lasting nature, neither depending upon the fancy of foreigners, nor standing in any dread of competition.—Such commerce, therefore, must be accounted the only sure and substantial foundation of naval power."—*Thoughts on the Naval Strength of the British Empire.* By Sir John Sinclair, Bart. London 1795, page 7.

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"In case of the repeal of the salt-duty, that valuable branch of national industry, the fisheries, would receive a stimulus which could be derived from no other source; and hence it would soon nearly double its present importance,—a serious consideration for Government, and not lightly to be disregarded. This assertion may appear paradoxical, when it is known that the fisheries are exempt from any duty; but I have the concurring testimonies of the principal fish-curers of the United Kingdom, that the penalties which guard the duties on salt, operate as a prohibition to the extension of the fisheries to a most alarming degree. The vexations and losses arising from these causes are often intolerable: and the operation of these restrictions occasions myriads of fish to pass on to more favoured coasts, and prevents thousands of hardy Britons from engaging in a pursuit which would add wealth to the nation, afford great additional employment to the coasting trade, and largely increase the nursery of seamen for our fleets."—*Mr. Horne's Letter*, p. 16.

The following opinions of the late Dr. Garnett are entitled to considerable credit: "The

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herring fisheries in the Highlands and Isles should," he says, "be encouraged by every possible means; not only because it is an excellent nursery of seamen, but because it is the only way in which these barren countries can acquire wealth and population. The poverty of the soil will prevent agricultural improvements beyond a certain and very limited extent; and the want of fuel, with the impossibility of raising any great quantity of provisions, will prevent the carrying on of manufactures on a very extensive scale; *but the fisheries are an inexhaustible fund of wealth, and can be carried to any extent whatever.* This is the true source of wealth to these parts of the kingdom; and if attended to, as its importance calls for, will fill all the indented shores of North Britain with population, wealth, and every comfort and convenience of life."

On the difficulty of extending, and even, at present, carrying on the fisheries, the Doctor states, that—"In order to procure salt for the purpose of curing fish, those who want it are obliged to go for it a considerable distance, and at the Custom-house make oath, that the salt which they purchase is for the curing of

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herring only; they must at the same time give a bond, which is not discharged till they take the herring, and what salt may remain above the quantity allowed for a certain number, is returned to places distant twenty miles. Indeed, from many parts, they are obliged to go double that distance to a Custom-house for a few baskets of salt, and return to the same Custom-house with the little fish they have cured, or perhaps with the salt without any fish at all. Besides, the people will never go to a distant Custom-house for salt, till the herring appear in the lochs, from the well-grounded fear that the fishing may fail, and that, having no proper place in which to keep the salt, it may in different ways be embezzled, and they incur all the penalties of the salt-laws. Even when the herring do appear, the weather may be bad, the distance of the Custom-house great, the salt damaged in their open boats, and the herring in a great measure disappear; or, at least, much valuable time is lost before they return home to their fishing. The lochs, which are often filled with herring; and would be a source of wealth to the inhabitants, and afford employment to many who are obliged to seek it at a distance, ARE

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RENDERED OF NO USE BY THE SALT-LAWS."—*Tour in Scotland, by Dr. Garnett, late Professor of Natural Philosophy and Chemistry at the Royal Institution.*

A patriotic Baronet whom I have before had the pleasure of quoting, has the following sensible and impressive observations: "In the millions of acres that surround our coasts, no partition of property, no cultivation of soil is required;—we have only to reap what the bounty of Providence has abundantly supplied. The boundless fields are already white for the harvest. The labourers are standing all the day idle, for want of employment—ready to enter on their task, as soon as the *financial prohibition* is removed. If we really mean that the fisheries should remain and prosper, as sources of internal supply and external commerce, as providing present employment for our sailors and future nurseries for our navy,—if we desire that the fisherman and cottager on the sea-coast should lay in a winter supply of salt-fish for themselves and their neighbours, we must no longer embarrass them with vexatious conditions, which *they cannot understand or comply*

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with: but leave them free to purchase at a cheap rate, and at the nearest shop, the salt required for curing their fish,—and to use it for the benefit of themselves and their country. Were the financial fetters of the salt-laws once removed, we should then see what NATIONAL INDUSTRY and NATIONAL ENTERPRISE could effect. Our sea-coasts would swarm with adventurous fishing-boats; new means of employment would be afforded to the necessitous and unemployed; new supplies of life would be conveyed into the interior of the island; new sources of commerce be opened to foreign countries, and nurseries of seamen abound on our sea-coasts. No region on earth is so well adapted to the *salt-fish* trade. We are a naval power: the ocean is our element. We possess a hardy enterprising race of sailors, now grievously suffering for want of employment; we have shoals of fish surrounding our coasts, and an inexhaustible store of native salt, which may be more easily and *much more profitably* applied in curing fish, than by exportation."—*Sir Thomas Bernard's Letter to Mr. Vansittart*, page 17—24.



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Every thing may be expected from the industry of a people, who before Leland's time extracted pure salt from sea sand, by a troublesome operation indeed, but which nevertheless indicated both parts and patience *. They collected heaps of sand upon the sea-shore, which, by being often wet and dry, were richly impregnated, and upon these they poured sea-water till the sand became fresh †. This water they first evaporated in the sun, and then boiled with slow fires made of turf, out of their mosses, till it produced a clean white salt.

"Dr. Anderson," says the author of a popular work, "estimates that one hundred thousand fishermen might find constant employment in the British sea ‡. He thinks that, if this num-

* Leland's Itinerary, vol. v. fol. 84. where he mentions the village of Cockerham as the place in which he saw this process performed.

† Camdeni Britannia, p. 616, 617. Dr. Brownrigg's Art of making Salt, p. 135. Ray's Collection of English Words, p. 149.

‡ The truth of this position may be easily imagined from a single circumstance mentioned by Sir John Sinclair, who tells us "that ten thousand people are employed along the coast of England in the oyster fishery alone."—*Thoughts on the Naval Strength of Great Britain*, octavo, 1795, p. 7.

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ber of fishermen were employed, there would likewise be wanted twenty or thirty thousand mariners for transporting the cargoes to market, and for bringing the necessary return of salt, of coals, of grain, of casks, of the materials for ship-building, and the numberless articles dependent on an extensive fishery.

"Supposing that eighty thousand of these mariners were married, and that the husband had on an average four children, the total amount of their families would be four hundred thousand persons. These added to a hundred and twenty thousand seamen, would make, in the whole, an addition of five hundred and twenty thousand British subjects. But this is not all. These mariners and their families would not only supply a great part of the nation with an important article of subsistence, and thus lessen the wages of labour, but they would afford among themselves a wide market for the commodities of the farmer and the manufacturer. They would thus in a double way promote the public interest. They would lessen the expense of subsistence, and at the same time they would multiply the excitements to industry. The attainment of these two objects,

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is the very *alpha* and *omega* of national prosperity. We should then see land which gives not at present one shilling per acre of rent, produce from three to six pounds sterling. We should see a barren waste of stones and bogs, with scarce a single blade of grass upon it, converted into luxuriant crops of wheat and clover. Manufacturing villages would rise in the wilderness, that is now only distinguished by monumental vestiges of the Picts or the Druids. The farmers and manufacturers would very likely increase to an equal number with that of the fishermen, and Britain might thus acquire an augmentation of a million and forty thousand subjects."—*The Political Progress of Britain*, page 71.

" Oh, is there not some patriot, in whose power
That best, that godlike luxury is placed
Of blessing thousands, thousands yet unborn,
Through late posterity? some large of soul,
To cheer dejected industry? to give
A double harvest to the pining swain?
And teach the labouring hind the sweets of toil?
..... with venturous oar
How to dash wide the billow; nor look on,
Shamefully passive, while Batavian fleets
Defraud us of the glittering finny swarms,

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That heave our friths, and crowd upon our shores;
How all-enlivening trade to rouse, and wing
The prosperous sail, from every growing port,
Uninjured, round the sea-encircled globe;
And thus, in soul united as in name,
Bid Britain reign the mistress of the deep?—

THOMSON'S *Autumn*.

"In the Report of the Committee of the DOWNS FISHERY (of which the Earl of Liverpool is Patron, and Lord Gambier President,) the annual loss to the revenue by the *smuggling* of goods on the southern coast of the island is estimated at two millions a-year. Whenever the repeal of the salt-duties shall offer to our SMUGGLERS the honest trade of *fishermen* instead of their present course of life, the saving thereby to the revenue, in this respect only, would go a great way to compensate for the abolition of all the salt-duties."—*Sir Thomas Bernard's Letter to Mr. Vansittart*, page 49.

"You have said that your improvement of your fisheries had not reached its height.—This then is the moment to reach it by the most unremitting exertions.—Neither the sea nor the land can have been enjoyed to the full, whilst

your population is under difficulties for support. In times of distress therefore, when the plough may fail you, a well ploughed ocean would be a constant refuge—You can there have no unpropitious seed-times, nor uncertain harvests; tempests could only disperse the reapers for a short season, and the crop would always remain undamaged in a boundless extent.

"I fear there is a fatal bar to improvement. —Be assured, every attempt towards it must be abortive whilst you keep up your duty upon salt, because the allowances you make to those who are engaged in fisheries, guarded by the necessary forms to prevent frauds upon so important a revenue, render them of no use whatsoever, and fish can never be made a support for an inland population in their natural state. Is it not, then, the height of folly to have resort to foreign fisheries at an immense distance, when other nations leave their own coasts and come almost into your harbours, from the superior abundance of your seas?—They take your finest fish—they cure them with your own salt, the best in all the world, which is duty-free when exported;—they maintain their people in comfort, whilst yours are every where

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starving, and prosper by a trade out of which you might drive all nations before you—securing your maritime greatness whilst you increased your internal strength.—In the creeks and harbours of all countries, the smaller fish are always so numerous that they are used for manure in quantities that almost exceed belief. —Is it certain that with the use of salt they might not be applied also to purposes more useful, and instead of being entirely cast out in large masses to fructify by corruption, be preserved from it by chemical skill, and be devoted to the subsistence of mankind?"—*Armata*, page 188—190.

Reasons for the extension of the British fisheries, published two hundred years ago, and now reprinted from a scarce pamphlet entitled 'ENGLAND'S WAY TO WIN WEALTH, and to employ Ships and Mariners, by Tobias Gentleman. Quarto, printed at London 1614, and dedicated to the Right Noble, Learned and truly Honourable Henry Lord Howard, Earl of Northampton.'

"It seemeth that the wisdom of our gracious

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God hath reserved us, as some precious gem, unto himself in invironing our country with the plenteous ocean sea, and dividing us from the whole continent of the rest of the inferior world, by our rich and commodious element of water, which in due seasons yieldeth to us in abundance; for although our champaign soil by the diligence of the husbandman be plentiful unto us, yet do these watery regions and dominions yield yearly great variety of all kinds of most wholesome and dainty fishes; so that it may seem strange and disputable, and hard to determine, which of His Majesty's dominions, of the land or sea's be richest.

"I entered into the cogitation of writing this true relation, out of my own experience and knowledge, touching the inestimable sums of money taken yearly for fish and herrings, *out of His Majesty's seas by strangers*, whereby they have not only maintained their wars many years against the Spaniard both by land and sea; and at length, they have not only wearied him in the wars, and brought him to good terms and reasonable composition; but also it is most apparent, notwithstanding the huge

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charge of their wars so long continued, which would have made any other nation poor and beggarly, they, on the contrary, are grown exceeding rich and strong in fortified towns and beautiful buildings, in plenty of money and gold, in trade and traffic with all other nations; and have so increased and multiplied their shipping and mariners that all other nations and countries in the world do admire them.

"And what their chiefest trade is, or *their principal gold mine*, is well known to all merchants that have used those parts, and to myself and all fishermen; namely, that His Majesty's seas is their chiefest, principal and only treasury, whereby they have so long maintained their wars, and have so greatly prospered and enriched themselves. If their little country of the United Provinces can do this, then what may we His Majesty's subjects do, if this trade of fishing were once erected among us, we having in our countries sufficient stores of all necessaries to accomplish the like business; for the Hollanders have nothing growing in their own land for that business, but they are compelled to fetch all their wood, timber, and

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plank, wherewith they build and make all their ships of, out of divers countries, and their iron out of other places; their hemp and cordage out of the Eastern countries; their hoops and barrel-boards out of Norway and Sprucia; their bread corn out of Poland, and the East parts; their malt, barley, and best double drink from England, and also all their fish and chiefest wealth out of His Majesty's *seas*; which they do transport unto the foresaid countries, and return for the produce of fish and herrings the forenamed commodities; whereby their ships and mariners are set on work and continually multiplied, and into their countries is plentiful store of money and gold daily brought, only for the sale of fish and herrings.

"In the midst of the month of May do the industrious Hollanders begin to make ready their busses and fisher fleets; and by the first of their June, are they yearly ready, and seen to sail out of the Maeze, the Texel, and the Uly, one thousand sail together for to catch herrings in the North seas—six hundred of these fisher ships and more are great busses, some six score tons, most of them a hundred tons, and the rest three score and fifty tons, the

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biggest of them having four-and-twenty men, some twenty, and some eighteen and sixteen men a piece; so that there cannot be in this fleet, of people, no less than twenty thousand sailors.

"These having with them bread, butter, and Holland cheese, do daily get their other diet out of His Majesty's *seas*, besides the lading of this fleet, *three times each vessel*, commonly before St. Andrew, with herrings, which being sold by them, but at the rate of ten pounds the last, amounteth unto much more than the sum of *one million of pounds sterling*; only by this fleet of busses yearly; no king upon the earth did ever see such a fleet of his own subjects at any time, and yet this fleet is yearly to be seen. A most worthy sight it were, IF THEY WERE MY OWN COUNTRYMEN; yet I have taken pleasure in being amongst them, to behold the neatness of their ships and fishermen, and all labouring merrily together, whereby the poorest sort of themselves, their wives and children, be well maintained, and no want seen amongst them. And thus north-west and by north hence along they steer, sailing until they do come unto the Isle of Shetland, *which is His Majesty's domi-*

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nion.—Now if that it happen that they have a good wind to be at Shetland before the 14th day of June, then they do put all into Shetland, and there they frolic it on land, until that they have sucked out all the marrow of the malt, and good Scotch ale, which is the best liquor that the island doth afford; but the 14th day of June being once come, away they all go, for this is the first day by their own law, before which time they must not lay a net, for until then, the herrings be not in season, nor fit to be taken to be salted.

"From this place, it being nigh two hundred leagues from Yarmouth, do they now begin first to fish; and *they never do leave the shoals of herrings, but come along, amongst them, following the herrings as they do come five hundred miles in length,* and lading their ships twice or thrice before they come to Yarmouth, with the principal and best herrings, and sending them away by the merchant-ships that come unto them, that bring them victuals, barrels, and more salt, and nets if that they do need any.

"Now besides this great fleet of busses the Hollanders have a huge number more of smaller burthen, only for to take herrings also, and

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these are of the burthen from fifty to thirty and to twenty tons; the greatest of them having twelve men each, and the smallest eight and nine.—There have been seen and numbered, of busses, and these in Brace's-sound, and going out to sea and at sea, in sight at one time, two thousand sail; besides them that were at sea, without sight, which could not be numbered.

"And whereas I have made a true narration of their fleets of busses, and only the herring fishery-men, that are on His Majesty's seas, from June until November, I will here also set down the fishermen that all the year long, in the seasons, do fish for cod and lings continually, going and returning laden with barrelled fish.

"And these be pinks and well boats of the burthen of forty tons, and the smallest thirty tons, and these have some twelve men a piece one with another; and there is of this sort of fisher boats, beginning at Flushing, Camfere, Surwick-sea, the Maeze, the Texel, and the Fly, and the other sandy islands, about five or six hundred sail, which are fishing for cod, whereof they do make their barrelled fish.

"Besides all these pinks and well boats, the

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Hollanders have continually in the season, another fleet of fishermen, at the north-east head of Shetland, which are of another quality, and there are more than two hundred of these; and these be called fly boats, and these do ride at anchor all the season at Shetland, in the fishing grounds; and they have small boats within them, which be like unto cobles, the which they do put out to lay and hale their lines and hooks, whereby they do take great store of lings, the which they do not barrel, but split them, and salt them in the ship's bulk; and these they sell commonly for four and five pounds the hundred, and these go by the name of Holland lings; but *they are taken out of His Majesty's seas, and were Shetland lings before they took them there*; and for these lings they do carry away abundance of England's best money daily.

" Now to shew truly what the whole charge of a buss will be, with all her furniture, as masts, sails, anchors, cables, and with her fishers' implements and appurtenances, at the first provided all new, is a great charge; she being between thirty or forty lasts will cost some 500*l.* And the whole charge for keeping

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her at sea for the whole summer, or three voyages, for the filling of a hundred last of casks,

For one hundred last of barrels .	£72
Salt four months	88
Beer ditto	42
Bread ditto	21
Bacon and butter ditto . . .	18
Pease ditto	3
Billet ditto	3
Men's wages ditto	88
	£335

"A hundred last of barrels, filled and sold at 10*l.* the last, come to one thousand pounds.

Herrings	£1000
The whole charge . . .	335
Gotten . .	£665

"Here plainly appeareth, that there is gotten 665*l.* in one summer, whereout if you do deduct 100*l.* for the wear of the ship, and the reparations of her nets for the next summer, yet still there is 565*l.* remaining for clear gains by one buss, in one year.

"Now to shew the charge of a pink of eighteen or twenty lasts, the pink being built

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new, and all things new unto her, will not cost 260*l.*, with all her lines, hooks, and all her fisher appurtenances.—And

Fifteen lasts of barrels will cost	£10
Five weighs of salt upon salt .	15
For beer and casks	7
Bread	3
Butter	1
The petty tally	1
Men's wages for two more months and altogether	20
	57

"Fifteen lasts of barrelled fish, at 14*l.* 8*s.* the last, which is but 24*s.* the barrel, amount unto 216*l.* whereout if you deduct 57*l.* for the charge of setting her to sea, there is still resting 158*l.* clear gains, by one pink, with fifteen lasts of fish for one month.

"Wherefore, seeing the profit so plainly, and by the grace of God so certain, both for busses and line-boats, whereby the Hollanders have so long gained, let all noble, worshipful and wealthy subjects put too their adventuring and helping hands, for the speedy launching and floating forward of this great and good

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common wealth business, for the strengthening of His Majesty's dominions with two principal pillars, which is, with plenty of coin brought in for fish, and herrings from other nations; and also for the increasing of mariners against all foreign invasions, and also for the bettering of trade and occupations, and *setting of thousands of poor and idle people on work, which now know not how to live,* which by this trade of the busses shall be employed, as daily we see is done before our eyes by the Hollanders. And as always it hath been seen, that those who are now the fishermen of England, have been always found to be sufficient to serve His Majesty's ships in former time, when there has been employment; which fellows, by this new trade of building and setting forth busses, will be greatly increased and multiplied in this land; which fellows, as we see the Hollanders, being well fed in fisher affairs, and stronger and lustier than the sailors that use the long southern voyages, that sometimes are greatly surfeited *, and hunger pined. But these courageous,

* By this term he explains himself in a note to mean *drunken and debauched.*

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young, lusty, strong fed yonkers that shall be bred in the busses, when His Majesty shall have occasion for them in war against the enemy, will be fellows for the nonce, and will shew themselves right English, and will put more strength to an iron crow, and a piece of great ordinance in traversing of a cannon, or culvering, with the direction of the experienced master gunner, than two or three of the forenamed drunken and debauched sailors."

In a note to this singular production, he says,

"The Hollanders do yearly take so many fish in our seas, as they do make more than two millions of pounds sterling of. And we His Majesty's subjects do take no more than to bait our hooks," says the author. In another note he adds, "I have rated the herrings but at 10*l.* the last, which is with the least, for they be commonly sold by the Dutch, at Dantzic, for 15*l.* and 20*l.* the last."—The whole of this curious, and (to an Englishman) very interesting Tract, may be seen in the *Harleian Miscellany*, vol. iii. octavo, page 232.

In the seventeenth century, a Mr. Goffe

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published his Proposals how to advance the trade of the nation, and amongst other things, he makes the following observations, which show how anxious thinking persons formerly were, to extend the national fisheries.

"Near each fishing port throughout the kingdom, there are commonly barren lands, which may be rented at 4*d.* or 6*d.* per annum an acre.

"PROPOSED,

"That a convenient parcel of such lands, near each fishing port, be rented or purchased at the nation's charge, to erect fishing factories on, for sowing hemp and flax, and planting of trees, such as are convenient for building of ships, hoys, and busses.

"That there be some knowing men chosen out of the neighbouring parishes, near each of these fishing ports, to mark out the land into parcels, and that they ascertain the price of every acre what the labour is worth to clear the same.

"That there be a proclamation published throughout the kingdom, that all those who are in debt and do deliver up to their creditors all the effects they have, wearing-apparel and

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household goods only excepted, shall be protected from being arrested or molested from any such debt or debts; and all tradesmen likewise, that are willing to settle or inhabit there on any of the fishing factories, shall be likewise protected.

"That whereas, at most of these ports are places where wool is commonly sent away at stealth and prohibited, and other *Custom-house goods privately run ashore*, that any person belonging to these fishing factories, who shall seize any such goods, shall be allowed one-half part of all such goods to themselves.

"That, at every of these fishing ports, there be four fishing busses belonging to each factory, with all nets and other fishing tackle, provided with the master, and manned with fishermen to teach the people to catch fish, and they to be paid first at the public charge.

"That all the parishes throughout the kingdom do send their ablest poor to be employed at these factories; some to dig, plant, and till the ground, and the others to be employed to work up the hemp and flax, and to make sail-cloth, cordage, nets, twine, lines, and sails; the women to spin, and make coarse linen, &c., and;

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as the profits come in by this undertaking, the parish taxes will abate throughout the kingdom.

"That there be a large work-house or work-houses erected at every of these fishing ports, and that there be master workmen paid at the public charge, to teach the people to work, which, in time, will teach one another; that these master workmen be men of knowledge and understanding in making of sail-cloth, nets, cordage, twine, lines, and all other necessaries belonging to the fishing trade.

"That in every particular sort of work the full current price for every thing be ascertained, and that they may be allowed a sufficient rate for their work, until their slow hands be brought to quick working; for afterwards the price will fall in course, and those which are become used to clearing of lands, will take lands of their own accord, and clear it to get themselves a livelihood; and so likewise, in fishing, they will in time be able to join together, and go a fishing at their own charge when they find the profit thereof.

"To encourage this undertaking, that all the sail-cloth which shall be used for the Royal

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Navy be wrought up at these work-houses belonging to these fishing factories; and to bring the merchant-men to buy theirs, in the nation, the following method is proposed:

"That there be a high duty laid on all new sails of foreign made cloth, which shall be used to any of our English ships, hoys, lighters, busses, boats, or any others; that the duty be collected at the Custom-house, which will in time hinder merchant-men and others from buying their sails at foreign markets; and that all our sail-cloth be made with a blue stripe or mark through every piece.

"That all foreign nets be prohibited from being imported: by which means several of our poor may be employed, and *all those who want work, and are in debt and have not to pay, will flock to these fishing factories; and instead of lying in jails, and their families becoming burdensome to the parishes, we shall have our barren lands cleared, tilled, manured, and well wooded with fine groves of trees fit to build shipping;* which will shelter those bleak and wild places; and those ports in time will become famous fish-markets, and these men well disciplined, and will breed up a nursery of seamen

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ready to man our Royal Navy on any occasion. By this, our lands and our livings will be secure from the attempts of any foreign enemy, our trade will flourish, and our poor be provided for, and will be an everlasting safety and happiness to our kingdom and government; which God long preserve."—Copied from a scarce tract, entitled "*How to advance the Trade of the Nation and to employ the Poor,*" addressed to the Knights, Citizens, and Burgesses assembled in Parliament, by William Goffe.

All that now remains is that I attempt to make a calculation of the probable consumption of common salt in England and Wales, if the duty on salt should be repealed. And here it behoves me to implore the candour of the public, should any errors be discovered in the following data, or in the computations founded upon them. I have availed myself of the best documents that I could obtain; and having no private interests to serve, I have had no temptation to over rate or under rate any thing.

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Number of Acres in England and Wales.

Dr. Becke, in his pamphlet on the Income Tax, supposes that there are in England and Wales,

	Acres.
In pasture, in meadows, &c.	17,481,000
In arable land	11,491,000
To this he adds,	
Waste land, roads, water, &c. .	7,888,777
Total .	36,860,777

For a confirmation of this statement, see the statistical account of England and Wales, in Dr. Brewster's Edinburgh Cyclopedia, 1815.

Now, if one bushel of salt per acre be sufficient for pasture land, and three bushels per acre be on an average sufficient for arable land, this computation gives a consumption of salt for land only, of 51,950,000 bushels, or 1,298,850 tons, per annum.

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Probable Number of Horses in England and Wales.

In 1804 the number of horses for which duty was paid, was 1,780,000. Besides these there were others; and from the communications made to the Board of Agriculture on this subject, it was calculated that at that period there were as under:

Pleasure horses	200,000
Cavalry horses	40,000
Employed in husbandry . .	1,200,000
Colts and mares	350,000
Total . .	1,790,000

One of the largest graziers in England, a member of Parliament, tells me, that if there were no duty on salt he should use it largely for his horses: but I have not seen any printed statement of the precise quantity which it would be proper to administer with the food of these animals.—If we suppose the consumption to be the same as with cows, (see an account of the cattle of England and Wales), it

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would be six cwt. per horse. This would amount to 21,480,000 bushels, or 537,000 tons per annum.—See the French account, page 152, line 14. Also, Lord Somerville's Testimony, page 159, line 20.

NUMBER OF CATTLE IN ENGLAND AND WALES.

There are no data on which to found an accurate estimate of the number of cattle (distinct from horses and sheep) kept in England; though, as the English nation consume a much greater proportion of meat than most other countries, the number must be very considerable.

Mr. Arthur Young, in his "*Tour to the North of England,*" estimated the value of beasts at 36,480,000*l.*; and as, at that period, the average value of cattle could not be more than 10*l.*, the whole number then kept was probably about 3,648,000.

Respecting the quantity of salt likely to be used for cattle, I understand that some very intelligent farmers purpose to use six cwt. per ox or cow, per annum, if the duty were repealed

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—the same quantity as proposed for horses; which would amount to 43,776,000 bushels, or 1,094,400 tons of salt per annum.

Number of Sheep in England and Wales.

From the data which have been given in the Statistical Account of England, the important point respecting the number of sheep in this country may I think be ascertained, with as near an approximation to the truth as can well be expected on such a subject. The following table will exhibit the result.

Number of long-woolled sheep .	4,153,308	
Number of short-woolled ditto .	14,854,299	
Total number shorn .		19,007,607
Slaughter of short-woolled sheep, per annum	4,220,748	
Carrion of ditto	210,087	
Slaughter of long-woolled ditto ..	1,180,413	
Carrion of ditto	59,020	
Slaughter of lambs	1,400,560	
Carrion of ditto	70,028	
		7,140,856
Total number of sheep and lambs in England and Wales		26,148,463

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We have the published authority of Lord Somerville for computing the consumption of salt by sheep, when it is regularly given, to be one ton of salt per annum for every thousand sheep. This will occasion a consumption of upwards of 1,045,920 bushels, or 26,148 tons per annum.

Here it may be worth while to remark, that M. Villars's statement is one ounce to each sheep every eight days, (see page 49 of this volume, line 12,) which gives a proportion of nearly 26 cwt. of salt per annum for every thousand head of sheep.

From the foregoing data, together with the variety of facts which are adduced in the preceding sheets, I am enabled to make out the following Table of the united quantities of salt, which, in case of the repeal of the salt-laws, will probably be consumed in these kingdoms.

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Quantity of Salt likely to be consumed in Great Britain and Ireland, in consequence of the Repeal of the Duty on Salt.

		TONS.
For arable and pasture land		1,298,850
For horses and colts		537,000
Cows, oxen, and calves		1,094,400
For sheep		26,148
Butter, cheese, hay and other farming purposes, in addition to what is now used		10,000
Domestic general purposes, ditto		20,000
Trade and manufactures, additional		40,000
Increased quantity for the fisheries		30,000
		3,056,398
Add for Scotland and Ireland, one half of the consumption of England		1,528,199
		4,584,597
From the above, deduct one half for the people not being at present accustomed universally to the use of salt		2,292,299
		2,292,298
Add salt *now* sold, viz. Present export and fisheries	140,000	
Present home consumption	55,000	
		195,000
Total .. .. Tons		2,487,298

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From the enquiries which I have been enabled to make respecting the salt trade, I have learned, that in consequence of the large establishments which are necessary for the business, the boiling of salt has *long been a losing trade,* but that even some years ago none of the salt-makers could make more than two shillings per ton profit; and that if they could now obtain that profit they should be abundantly satisfied;—

On this datum I make the following calculation:

	£.	s.	d.
The amount of profit to the salt-makers, on an expected consumption of 2,487,298 tons, at 2*s.* per ton	248,729	16	0
Profit on the present consumption of 195,000 tons, if at 2*s.* per ton ..	19,500	0	0
Additional profit	229,229	16	0

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TABLES.—No. I.

An Account of the PRODUCE of the SALT-DUTIES in ENGLAND, for Three Years and a Half, ending 5th Jan. 1801.

	From 10th Oct. 1798 to 5th Jan. 1799.			To 1800.			To 1801.		
	£.	s.	d	£.	s.	d.	£.	s.	d.
Gross Produce	51,227	12	5¼	882,108	16	2½	947,129	11	1
Charges of management and Drawbacks	4,094	3	1¼	107,802	8	4¼	101,706	9	0¼
Net Produce	47,133	9	4	774,306	7	9¼	845,423	2	0¼

No. II.

An Account of the Gross and Net Produce of the SALT-DUTIES in IRELAND, for the Years 1799, 1800, and 1801.

Years ending 25th March.	Gross Produce.			Net Produce.		
	£.	s.	d.	£.	s.	d.
1799	107,310	4	6	106,788	4	6
1800	102,844	16	3	102,111	7	0
1801	86,816	3	0	85,352	15	0

No. III.

An Account of the PRODUCE of the SALT-DUTIES in ENGLAND, for Six Years, from 1810 to 1815.

Years ending 5th July.	Gross Produce.			Expenses of collecting And allowances.			Net Produce.		
	£	s.	d.	£.	s.	d.	£.	s.	d.
1810	1,513,052	17	1¼	173,764	4	3¼	1,339,288	12	10¼
1811	1,539,601	16	1½	158,544	17	1½	1,381,056	19	0
1812	1,551,620	1	10¼	154,529	17	1¼	1,397,090	4	9
1813	1,536,231	0	11¼	149,748	12	1½	1,386,482	8	9¼
1814	1,538,436	11	10½	161,670	9	9	1,376,766	2	1½
1815	1,616,612	12	4¼	183,414	13	1¼	1,433,197	19	2¼

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No. IV.

An Account of the Quantities of Rock and White Salt EXPORTED from ENGLAND in the Years 1798, 1799, and 1800; distinguishing the several Countries to which they are exported.

	1798. Rock and White Salt.	1799. Rock and White Salt.	1800. Rock and White Salt.
	Bushels.	Bushels.	Bushels.
Denmark .	444,694	354,534	371,905
Russia . .	726,424	632,880	654,599
Sweden . .	5,080	38,148	24,480
Prussia . .	918,272	1,417,344	1,320,902
Germany .	420,903	189,262	236,394
Gibraltar .	267	. . .	72
Ireland . .	1,053,284	1,263,540	1,085,348
Isle of Man .	37,982	31,854	63,445
Isles Guernsey, Jersey, &c. . .	26,620	12,960	50,150
Un. States of America	892,430	1,026,617	1,436,085
British Continental Colonies .	298,871	342,491	551,958
West Indies .	59,885	58,556	70,709
Asia . . .	1,800	2,200	3,100
Africa . . .	68,636	98,421	66,966
Total . .	4,955,148	5,468,807	5,936,113

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No. V.

An Account of the Quantity of British Salt EXPORTED from LIVERPOOL during Six Years, from 1807 to 1812.

Years ending 5th January	To the United States of America.	To other parts of the World.	Total.
	Bushels.	Bushels.	Bushels.
1807	2,466,351	4,822,974	7,289,325
1808	2,514,670	5,630,062	8,144,732
1809	1,014,086	4,854,202	5,868,288
1810	1,638,716	6,502,399	8,141,115
1811	1,870,368	6,722,112	8,592,480
1812	394,541	4,870,704	5,265,245

No. VI.

An Account of the Amount of DUTY ALLOWED to sundry Merchants on the SALT EXPORTED from England for Six Years, from 1810 to 1815.

Years.	Amount of Drawbacks. £.	s.	d.
1810	81,212	10	$2\frac{3}{4}$
1811	69,231	15	0
1812	52,266	0	$0\frac{1}{4}$
1813	48,260	10	$3\frac{3}{4}$
1814	59,451	6	8
1815	65,740	16	$1\frac{3}{4}$

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No. VII.

An Account of the Amount of DUTIES ALLOWED to sundry Merchants for SALT LOST or DAMAGED at Sea.

Years.	Sums allowed. £.	s.	d.
1810	9,820	0	11
1811	17,394	6	3½
1812	8,490	17	8¾
1813	3,454	4	8¼
1814	3,677	17	0½
1815	11,394	15	3¾

No. VIII.

An Account of the BOUNTIES allowed on SALTED PROVISIONS exported from England in Six Years, from 1810 to 1815.

Years.	Bounties. £.	s.	d.
1810	12,661	19	6¼
1811	8,148	6	3¾
1812	23,592	8	5¾
1813	21,165	0	9¼
1814	19,578	5	1¾
1815	24,710	12	1½

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No. IX.

An Account of the Amount of Duties allowed to the Makers of Oxy-muriatic Acid in England for Six Years, from 1810 to 1815.

Years.	Drawbacks. £.	s.	d.
1810	35,785	1	8
1811	27,345	13	9
1812	34,162	16	3
1813	39,550	15	11¾
1814	39,537	18	9
1815	44,529	10	0¼

No. X.

An Account of the Quantity of Barilla imported into Great Britain, and of the Duties paid thereon, from the Year 1796 to the Year 1800 inclusive.

Year.	Quantity. cwt.	qrs.	lbs.	Duty. £.	s.	d.
1796	86,723	3	20	22,669	11	9
1797	51,105	0	14	14,391	9	9
1798	119,180	1	1	34,152	18	8
1799	141,667	1	15	40,635	3	2
1800	172,454	1	0	49,657	18	8¾

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No. XI.

An Account of the Quantity of PEARL-ASH IMPORTED into GREAT BRITAIN, and of the Duties paid thereon, from the Year 1796 to the Year 1800 inclusive.

Years.	Quantity. Free.			Chargeable with Duty.			Duty Paid.		
	cwt.	qrs.	lbs.	cwt.	qrs.	lbs.	£.	s.	d.
1796	24,945	0	25	20,345	1	2	2,289	6	8
1797	25,673	1	9	11,000	2	21	1,305	2	5
1798	11,847	2	5	48,843	2	0	2,587	0	6
1799	7,221	2	17	44,244	3	10	2,246	16	2
1800	6,198	0	10	38,203	2	20	2,392	15	7½

No. XII.

An Account of the Quantity of POT-ASH IMPORTED into GREAT BRITAIN, and of the Duties paid thereon, from the Year 1796 to the Year 1800 inclusive.

Years.	Quantity. Free.			Chargeable with Duty.			Duty Paid.		
	cwt.	qrs.	lbs	cwt.	qrs.	lbs.	£.	s.	d.
1796	46,298	2	2	16,530	1	27	1,854	9	7
1797	44,408	3	16	12,870	3	21	1,568	16	3
1798	28,040	1	11	53,442	1	20	1,733	10	2
1799	16,933	2	20	60,181	1	22	2,456	13	8
1800	34,165	0	9	101,235	3	23	2,505	4	6½

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No. XIII.

An Account of the Quantity of Pearl and Pot Ashes imported into Ireland from the Year 1797 to the Year 1801 inclusive.

Years ending 25th March.	Pearl- and Pot-ash Imported.		
	cwt.	qrs.	lbs.
1797	106,549	3	7
1798	54,974	0	21
1799	117,243	1	7
1800	159,580	3	14
1801	117,728	1	19

No. XIV.

An Account of the Quantity of Pot and Pearl Ashes imported from Russia and the Baltic Ports into Great Britain during Five Years, with the Amount of Duties received thereon.

Year.	Quantity.			Amount of Duty.		
	cwt.	qrs.	lbs.	£.	s.	d.
1805	12,543	2	27	2,651	13	9
1806	33,934	3	25	7,577	0	7
1807	36,043	3	14	8,293	2	3
1808	14,878	1	12	3,589	7	2
1809	29,743	3	0	7,812	15	9

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No. XV.

An Account of the Quantity of Pot and Pearl Ashes imported from Ireland, Guernsey, &c. into Great Britain during Five Years, with the Amount of the Duties received thereon.

Year.	Quantity.			Amount of Duty.		
	cwt.	qrs.	lbs.	£.	s.	d.
1805	607	3	1	73	14	4
1806	2,379	2	2	178	3	2
1807	11	2	27		16	0
1808	2,924	1	7	317	6	10
1809	3,279	2	15	333	16	7

No. XVI.

An Account of the Quantity of Pot and Pearl Ashes imported from the United States of America into Great Britain during Five Years, with the Amount of Duties received thereon.

Year.	Quantity.			Amount of Duty.		
	cwt.	qrs.	lbs.	£.	s.	d.
1805	51,476	0	11	4,180	10	8
1806	69,249	0	22	5,979	3	5
1807	72,163	0	26	6,383	12	11
1808	19,171	3	9	1,734	8	9
1809	87,934	3	13	22,221	11	7

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No. XVII.

An Account of the Quantity of Pot and Pearl Ashes imported from the British North American Colonies into Great Britain during Five Years, with the Amount of Duties received thereon.

Year.	Quantity.			Amount of Duty.		
	cwt.	qrs.	lbs.	£.	s.	d.
1805	23,125	2	9	1,489	1	6
1806	19,265	1	10	1,284	16	10
1807	36,793	3	7	2,634	11	0
1808	72,509	1	15	4,964	10	7
1809	79,814	0	11	5,506	18	5

No. XVIII.

An Account of the Quantities of Barilla and Pot and Pearl Ashes imported into Great Britain during the last Ten Years.

Year.	Barilla imported.			Pot and Pearl Ashes imported.		
	cwt.	qrs.	lbs.	cwt.	qrs.	lbs.
1807	119,334	3	4	147,337	1	0
1808	221,400	2	11	112,673	0	24
1809	358,078	1	5	201,118	1	22
1810	335,537	3	26			
1811	136,902	3	22			
1812	65,099	2	26	89,528	3	26
*1814	128,156	3	24	51,941	1	0
1815	75,035	3	26	128,416	3	17
1816	221,357	1	24	149,478	1	22

* The quantities imported in 1813 cannot be given, as the records of that year were destroyed by the fire at the Custom-house.

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CHEMICAL ESSAYS

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A

LETTER

TO

FARMERS AND GRAZIERS

ON THE ADVANTAGES OF USING

SALT

IN AGRICULTURE, AND IN FEEDING CATTLE.

BY

SAMUEL PARKES, FLS. MRI. FSA.E.

Member of the Geological Society of London, and of the Wernerian, Horticultural, and Highland Societies of Scotland; Honorary Member of the Royal Geological Society of Cornwall; and Corresponding Member of the Literary and Philosophical Society of Manchester.

THE FOURTH EDITION,

ENLARGED AND CORRECTED.

LONDON:

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" Quin et pecudes armentaque et jumenta sale maxime solicitantur ad pastum, multò largiore lacte, multóque gratiore etiam in caseo dote. Ergo hercule vita humanior sine sale nequit degere," &c.

PLIN. *Nat. Hist.* lib. XXXI. cap. VII.

" At cui lactis amor, cytisum, lotosque frequentes
Ipse manu, salsasque ferat præsepibus herbas.
Hinc et amant fluvios magis, et magis ubera tendunt,
Et salis occultum referunt in lacte saporem."

VIRG. GEORG. lib. iii. ver. 394.

B. Clarke, Printer, Well Street, London.

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TO THE FIRST EDITION.

It is more than twenty years since the attention of the Author of this Letter was directed to an examination of the laws relating to Salt, in consequence of some chemical experiments in which he was at that time engaged; and the impression which the investigation of those laws produced upon his mind was then so strong, that he determined to avail himself of every favourable opportunity of exhibiting to the public the advantages which would result from their repeal.

This determination was considerably strengthened by the frequent interviews which he had with the late Mr. Hollinshead, a gentleman of large landed property at Chorley, in Lancashire, who spent many years in making experiments upon his own estate with Waste Salt, and also in endeavouring to procure an act of parliament to protect the farmer and manufacturer in the unlimited use of Common Salt.

In order, however, to enable the reader to perceive the progress of public opinion on this important subject; to explain why the question of the repeal should have lain so long dormant; and to shew why the writer of the following sheets should be induced to take so warm an interest in promulgating the alterations which the Salt

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laws have lately undergone, he is desirous of giving a very short outline of the measures which were taken both in and out of parliament to forward an event of so much consequence to the agricultural interests of the country.

In the year 1800 much discussion, respecting the general operation of the Salt laws, took place in a Committee of the House of Commons on the herring fishery; and in the following year, owing in some measure to the exertions of Mr. Hollinshead, another Committee was appointed by the House of Commons, expressly "To inquire into the laws relating to the Salt duties, and the means of remedying the inconveniences arising therefrom, and to report the same from time to time to the House."

It was late in the sessions of 1801 when this committee was appointed, yet it sat for a considerable time, and presented two very important reports to the House, in which the following striking passages occur.

"The committee appointed to inquire into the laws relating to the Salt duties, and the means of remedying the inconveniences arising therefrom, have proceeded further to inquire into the matters referred to them, and report—

"That they feel themselves indispensably bound to state, that all their inquiries have tended to impress more strongly upon them the extreme difficulty, not to say the impossibility, of reconciling the collection of any considerable revenue from Salt, with *the invaluable advantages which would arise from an* UNRESTRAINED trade in, and UNLIMITED *use of that article.* On this subject, the sentiments of the last Committee of the British parliament on the herring fishery entirely coincide with theirs.

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" Concurring entirely in the opinion of the committee of last year, but feeling at the same time most strongly the urgent necessity of supporting the public revenue, in a crisis like the present, your committee have come to the following resolutions, which they submit to the judgment of the House, viz. *Resolved*, That it is the opinion of this committee, that a commutation of the duties on Salt would be productive of many great and important advantages to all descriptions of persons in this kingdom, and would be highly beneficial to its agriculture, fisheries, trade, and manufactures."

When this valuable report was presented to the House of Commons, Mr. Pitt made the following declaration: " That whenever the return of peace enables His Majesty's ministers to venture on a diminution of the revenue, the repeal of the duty on Salt shall have their first consideration." Notwithstanding this assurance, and the reports of former committees, one of which declares that " the Salt duties are in their consequences detrimental to the public in a degree *far exceeding the payment of the tax itself*," only four years elapsed before Mr. Pitt, urged by the increasing pressure of the war, brought a bill into parliament for laying an additional tax of ten pounds per ton upon Salt; and the duty was immediately raised from twenty to thirty pounds per ton.

In consequence of these unfavourable circumstances, little probability remained that any relief in the affair of the Salt duties could be afforded to the country for many years; however, in the year 1816, the consideration of the subject was revived by the late Sir Thomas Bernard; and it is gratifying to the author of the present publication to believe that he was instrumental in exciting the attention of that excellent man to a cause so deserving

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of his support, and which he felt to be of so much national importance, that he determined to call the attention of His Majesty's ministers to it, by laying before them not only the result of the information obtained from the source already alluded to, but such other observations as he could collect from every authority within his reach.

Having had several previous meetings of members of parliament, and other gentlemen, at his own house, to consult upon the measures proper to be adopted, the worthy baronet, towards the latter end of the year 1816, addressed a printed letter upon the subject to the Right Honourable Nicholas Vansittart, and the same was immediately republished as an introduction to the seventh volume of the "Reports of the Society for bettering the Condition of the Poor." Another very interesting letter to Mr. Vansittart, from William Horne, Esq. of Liverpool, was published about the same time; and to the effect which these pamphlets had upon the public mind, together with the extraordinary zeal of Sir Thomas Bernard, and that of a few friends whom he had interested in the question, may be attributed the whole of the investigations which afterwards took place before the Honourable the Board of Trade, and the Committee of the House of Commons.

The examinations before the Board of Trade commenced in the month of April, 1817, and continued, at short intervals, for many days. The written evidence that was delivered on this occasion was printed last year, by order of the House of Commons, and it was from this evidence that those extracts were taken which will be found in the Appendix, No. 66—72.

Early in the last sessions of parliament, a select Com-

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mittee of the House of Commons was appointed, on the motion of Mr. Calcraft, to hear such evidence respecting the operation of the laws relating to Salt as should be adduced, and to report the same to the House. By their order the whole of this evidence was printed and attached to the report of the committee; and it is from this document that the important matter which is contained in the Appendix, from No. 73 to 81 inclusive, has been selected.

In making this selection, it was important to abstract only such parts of the evidence as particularly refer to the use of Salt in the several branches of husbandry, as it would have swelled the pamphlet too much to have given the whole of the examinations that were taken before the committee. For a similar reason, the several examinations which the author of the following sheets underwent on the same occasion are omitted; especially as they chiefly related to the operation of the Salt laws upon the *manufactures* of the country.

It must be admitted, that the extracts which are given in the Appendix, from the writings of such a variety of persons on the use of Salt in agriculture, are not of equal value; but it was desirable to collect whatever appeared to strengthen the evidence on such an important subject: and it is with great pleasure the author embraces the present opportunity of expressing his thanks to those friends who kindly furnished him with their suggestions. To the Right Honourable Sir John Sinclair, Baronet, to Dr. Paris, and to William Horne, Esq. of Liverpool, he is particularly indebted; and their communications he more especially recommends to the notice of the reader. These, together with the very striking

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evidence of John Christian Curwen, and Arthur Young, Esquires, on the important savings which would accrue to the nation from the general use of Salt in the food of cattle, sheep, and horses, afford a body of testimony which may be deemed irresistible.

The list of the agricultural societies in England and Wales is given, to enable those gentlemen who may institute experiments on the effects of Salt in the various departments of husbandry, to correspond with practical and experienced men, upon the results of their mutual researches; and the author flatters himself that it will prove useful.

It will be obvious, from the mode of printing, and from the price at which this publication is sold, that it is intended for general circulation; it is therefore hoped that the author may be allowed to suggest to those gentlemen who shall obtain copies, that considerable benefit may result from their lending them to their neighbours, and adopting such other measures as shall seem adviseable for making the subject of this pamphlet known throughout the district in which they live. He is anxious upon this point, that the present season may not be lost, and that every farmer may have an opportunity of learning how to avail himself of the advantages which the legislature of the country now offers for his acceptance.

London, Feb. 22nd, 1819.

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TO THE FOURTH EDITION.

THE very rapid sale of the three first impressions of this Letter has convinced me that the Public is really aware of the importance of the subject upon which it treats, and that the employment of Salt in agriculture will soon be as general in these kingdoms as it has long been in several of the other states of Europe, and on the continent of North America.

All the information that can be given respecting the mode of procuring Salt for agricultural purposes will be found at page 101 of the Appendix; and I have authority to say, that every supervisor of His Majesty's excise in Great Britain has received directions to furnish certificates, *free of expense,* to all those occupiers of land who require Salt, and shall apply for such certificates. From the number of letters of inquiry which I have received from all parts of the country, I find it necessary to repeat, that no Salt is allowed to be used in husbandry but such as is brought from the mines in Cheshire, or purchased at one of the authorized depôts; and I am sorry to say, that it is not likely that the government will at present consent to the employment of any other Salt at the low duty except the scaling of the salt pans, which is sold under the name of refuse Salt, and may be had at Nantwich, Droitwich, Malden, or other Salt-works, when mixed with ashes, free of duty.

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In order to remove the fears of those Farmers who may be apprehensive of incurring too large an expense of carriage, and to secure myself from the repetition of letters of inquiry on this point, I have endeavored to procure a most comprehensive list of Freights from Liverpool to the principal Sea-ports throughout the kingdom; and this is now printed at page 102 of the following sheets.

I have also to inform my readers, that since the publication of the last edition, an Act of Parliament has passed to facilitate the distribution of Salt, for feeding cattle, and for agricultural purposes, throughout Great Britain; and that this new statute, which is dated 2nd July, 1819, contains the following very convenient and important enactments.

Section xxxi. That it shall henceforth be lawful for any Salt-maker to mix his pan scales, and other coarse and impure saline substances, not being Salt fit for human consumption, with soot or ashes, in the proportion of not less than one-fourth of such soot or ashes, without payment of any duty for the same; and for any Fish-curer to mix his impure Salt, which is no longer useful for the cure of fish, with soot or ashes as aforesaid, for the purpose of manuring land, and for no other purpose whatever.

Section xxxiii. That it shall and may be lawful for any person or persons, (not being a Salt-refiner) at Liverpool, Glocester, Plymouth, London, Norwich, Hull, Newcastle-upon-Tyne, Leith, and Glasgow, (or at other places, with the approbation of the Commissioners of Excise) to provide and make use of a warehouse or warehouses, for the purpose of receiving Rock Salt, and from time to time to sell and deliver the same, or any part thereof, (being not less than one ton, if any part be unground) for the purposes aforesaid, provided the owners of such warehouses do enter into bond, and observe the several regulations which are laid down in the said act.

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Section xxxiv. And whereas formerly no Rock Salt could be delivered for agriculture except in lumps of twenty pounds each, be it enacted, that from and after the 5th day of July, 1819, it shall be lawful for any person or persons, who has or have made entry and given bond as aforesaid, to deliver Rock Salt in lumps not being of less weight than ten pounds; and that it may be delivered in small quantities when crushed and powdered, provided that before the delivery thereof it be mixed throughout with coal tar, in the proportion of not less than half a pound of coal tar for every bushel of Salt.

Here it may be remarked, that coal tar, in the proportion which the act enjoins, is found not to be injurious to cattle, and that a horse that takes three ounces of this discoloured Salt per day will not swallow a pound of the coal tar in less than eighteen months. All cattle take it with greediness.

Section xxxv enacts that the importers of Rock Salt may deliver it, being in no case less than one ton, to their customers directly from the ship or vessel, without being obliged first to land and warehouse the same, provided that every quantity of such Rock Salt as shall be so sold and delivered shall be accompanied with such permit as required by law.

In preparing this edition, the whole of the matter has been carefully reviewed, and such additions have been made as were thought necessary, particularly a List of those public Depôts of Rock Salt which have already come to my knowledge, and which will be found at page 103 of the Appendix.

London, November 1st, 1819.

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A

LETTER

TO THE

FARMERS AND GRAZIERS

OF

GREAT BRITAIN.

GENTLEMEN,

IN consequence of a late enactment of the Legislature of Great Britain in your favour, and of the share which I took in the preliminary measures for obtaining that enactment, I think it incumbent on me to invite your attention to the subject, by addressing to you, in this public manner, the following observations.

The facts which I shall lay before you are of that importanee to your own interests, and the promulgation of them is so likely to promote the welfare of the whole country, that I should consider myself culpable if I omitted to give them the greatest possible publicity, or if I neglected to use my best endeavours to place them in that clear point of view which should enable you fully to understand and appreciate them.

The expediency of manuring arable and pasture lands with Salt, and of administering the same active and wholesome substance to your horses, sheep, and cattle, as a condiment for their food, and as an efficacious means of preserving them in health and vigour, will form the principal objects which I am anxious to point out for your consideration, and future practice.

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After a candid and unprejudiced perusal of this Letter, you will, I trust, carefully examine the body of evidence which will be adduced in the Appendix, and then make such experiments upon your own estates, and with your own cattle, as are most likely to determine and convince you how far such a course of proceeding may be applicable in your own management.

The ever memorable SULLY, who was one of the greatest men France ever produced, used to say that it ought to be the first maxim of a good government to advance agriculture before manufactures, and to give to the latter only a secondary rank in the state—whereas, COLBERT, who was also a great minister, assigned to manufactures the first place in the economical order of his administration, and gave the utmost encouragement to the arts, from a persuasion that their prosperity would furnish the only means of working up the raw materials which his country produced. It is probable, however, that this eminent statesman would not have protected the arts at the expense of agriculture, if he had considered that the principal utility of manufactures in any country arises from the price which they afford to, and the market which they procure for, the products of the soil.

The immortal Sully, in vindication of the opinion which I have just quoted, used to say that he had ever preferred the products of the soil, which could not easily be ravished from him, to those foreign conquests which occupy the attention of most governments, but which always excite resentment and jealousy. "A large, and an increasing produce of the land," said he, "ensures the liberty of the people, while it places foreigners in a sort of dependence; whereas the want of corn, the first

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necessary of life, gives a dependence upon foreigners, who can either furnish the commodity or refuse it. The produce of the land," continues he, "cannot be consumed by strangers but to the profit of the inhabitants; that is, by a traffic more advantageous than the possession of the corn itself—whereas the arts and manufactures may possibly be carried off by the artifices of rivals, and pass away, together with the artists themselves, into all the countries of the world."

If these latter sentiments are founded in truth and justice, and I believe they are, then every improvement in the agriculture or rural economy of these kingdoms may be considered to be an important national acquisition; and I shall be excused in not offering any apology for endeavouring to call your attention to a practice which is little known in our country, but which in some foreign states has invariably been attended with decided advantages as well as profit.

The value of Common Salt for agricultural purposes has been long known in Germany,* in Poland,† in Holland, in Flanders, and in all the provinces of the United States of America;‡ it is therefore much to be lamented that the existing duties should so long have deprived the people of this country§ of the various benefits which they might have derived from this valuable native production.‖ The mineral substance of which we are speaking is found in this island in the greatest abundance,¶ yet, by a mistaken policy, we have

* See Appendix No. 2.
† See Appendix No. 3.
‡ See Appendix Nos. 45 and 64.
§ See Appendix No. 37.
‖ The value of Common Salt as a manure was known some hundred years ago by certain individuals in this country, but the high duties and other impediments have prevented its use becoming general. See Appendix Nos. 2, 4, 5, 6, 7, 10, 11, 12, 13, and 34.
¶ See Appendix No. 30.

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hitherto given it to strangers, and have allowed many thousands of acres of our own lands, which, by the free use of Salt, might have been rendered highly fertile* and profitable, to remain nearly sterile, or at least in a state in which they will barely pay for the expense of their cultivation.†

However, since the government has so far relaxed as to remit a great part of the duty on such Rock Salt as shall forthwith be consumed in agriculture, or in feeding cattle, and as so much depends upon the manner in which this valuable boon is received by the country, it is desirable that the greatest extent of publicity should be given to the act of parliament; and that no agriculturist, not even the most humble gardener, should remain ignorant of the terms and conditions upon which he may now obtain so rich and useful a commodity as Rock Salt.

Penetrated with the importance of the subject, and contemplating the variety of advantages which the landed interest must derive from the accomplishment of the measure, the act had no sooner passed than I determined to lay all the particulars before the public, in the hope that these concessions of the legislature, together with the evidence which I should be enabled to offer in proof of the advantages to be derived from the use of Salt, would be amply sufficient to induce a large majority of the farmers of Great Britain to acquire such a knowledge of the new regulations as would enable them, without delay, to avail themselves of all the benefits which the government has thus offered for their acceptance.

Having no private ends to answer, and expecting to

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* See Appendix Nos. 31 and 32. † See Appendix No. 37.

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derive no personal advantage whatever from the general adoption of this measure, I shall proceed to give you a simple outline of the general view which I have taken of the subject. It may, however, be necessary to premise, that my opinions thereon have been formed in consequence of a careful investigation of a great number of well-attested experiments, and from the perusal of that body of evidence which was delivered in the year 1817 before the Lords of his Majesty's most honourable Privy Council, at the Board of Trade; and again in the spring of the following year, before a select committee of the House of Commons; which committee was occupied from day to day, from the sixteenth of March to the fifteenth day of May, in questioning the witnesses, and in recording their respective testimonies upon this most important proposition.*

From an attentive examination of all these documents, and from a dispassionate consideration of every thing which I have been able to collect upon this great object, I am decidedly of opinion that Rock Salt, at the reduced duty of five pounds per ton, is by far the cheapest,† the most efficacious, and the most convenient‡ manure for arable and pasture land, that can possibly be obtained.

More than one hundred and fifty years ago, Sir Hugh Platt, an eminent writer of that day, speaks very decidedly of the benefits which might be derived from the practice of sprinkling Common Salt upon land, and calls it the *sweetest*, the *cheapest*, and the most *philosophical* marle of all others. He relates the case of a man, who, in passing over a creek on the sea-shore, suffered his

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* See Appendix No. 72 to No. 82. † See Appendix Nos. 6, 22, and 25.
‡ See Appendix No. 25.

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sack of seed-corn to fall into the water, and that it lay there until it was low tide, when, being unable to buy more seed, he sowed that which had lain in the salt-water; and when the harvest time arrived, he reaped a crop far superior to any in the neighbourhood. The writer, however, adds, that it was supposed the corn would not fructify in that manner unless it actually fell into the sea by chance; and, therefore, neither this man, nor any of his neighbours, ever ventured to make any further use of salt-water.

The same curious author tells us also of "a man who sowed a bushel of salt, *long since*, upon a small plot of barren ground on Clapham Common, and that to that day (the time when he was writing) it remained more fresh and green than any of the ground round about it."*

The eminent Dr. Brownrigg, who wrote in the year 1748, in speaking of Common Salt, says, "it is dispersed over all nature; it is treasured up in the bowels of the earth; it impregnates the ocean;† it descends in rains; it fertilizes the soil; it arises in vegetables; and from them is conveyed into animals; so that it may well be esteemed the universal condiment of nature; friendly and beneficent to all creatures endowed with life, whether it be vegetative or animal."

In some parts of Great Britain, particularly in the neighbourhood of the Salt Works,‡ the value of Common Salt, as a manure, is well known and acknowledged;

* See Appendix Nos. 38, 62, and 70.

† There is a practice in Cornwall of manuring the lands with sea-sand for the sake of the Salt that it contains; and so very efficacious is this found to be, that a writer, ninety years ago, computed the money laid out in that and the adjoining county for sea-sand to amount to thirty-two thousand pounds per annum; and so much has this practice encreased of late years, that Dr. Paris considers "the expense of land carriage for sand used as a manure in *Cornwall alone* as now amounting at least to thirty-thousand pounds annually." See Appendix Nos. 4, 7, 10, 11, 12, 17, and 40.

‡ See Appendix Nos. 23, 70, and 78.

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and it has lately been given in evidence before the select Committee of the House of Commons, by a gentleman of the highest credit, that the farmers in Cornwall are so convinced of the value of Salt as a manure, that whenever the waste Salt that has been employed in curing fish is on sale, there is a violent contention among the occupiers of the land who shall obtain the largest share.* The same gentleman informed the committee, that where wheat or barley has followed turnips, on land which had been salted, the ensuing crop has invariably escaped the mildew,† although that disease had affected all the corn upon the lands immediately adjoining, on which Salt had not been used.

The efficacy of Salt in destroying noxious weeds,‡ grubs,§ worms, flies, and insects,‖ is well known¶ in many districts, and those who are incredulous may very easily satisfy themselves by direct experiment. For instance, if a few common earth worms be taken out of the ground, and sprinkled with a little Salt, they will be seen to writhe about for a few minutes, and then expire. Thus Salt does, as it were, perform two operations at once, for, by destroying the worms and the weeds,* while the land lies fallow, it prepares the ground most effectually for the reception of the corn or the plants, before it can possibly take any effect upon the crop itself†. And besides this peculiar advantage, the extreme luxuriance and verdure‡ which common Salt gives to *grass* lands, when properly applied, would be so satisfactory to such farmers who would make use of it, and so convincing to

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* See Appendix Nos. 38, 72, and 79.
‡ See Appendix Nos. 4 and 14.
‖ See Appendix Nos. 4, 42, and 80.
* See Appendix Nos. 25 and 38.
‡ See Appendix Nos. 21 and 24.
† See Appendix No. 38.
§ See Appendix Nos. 20, 66, 73, and 81.
¶ See Appendix Nos. 3 and 79.
† See this fully explained in Appendix No. 25.

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all the neighbouring agriculturists of every description, that if only one or two gentlemen in each district were to employ it in a few instances, I am certain this mode of top-dressing* would very soon engage the attention of every person in the empire, who had even but a garden† to manage and cultivate.

From the evidence which has already been collected upon this subject, it is obvious that a great portion of the land in this kingdom might, by the proper use of Salt, be made to produce nearly double‡ the amount of the present crops of grass as well as corn. How greatly this would serve the manufacturing, and indeed all other interests of the country, I need not attempt to explain to you. Moreover, by forcing the land with a sufficient portion of Salt, our crops would be brought to maturity much sooner than they now are,§ a matter of considerable importance in the northern parts of this island, where much of the corn is frequently spoiled by the autumnal rains before it can be sufficiently dried by the sun and wind to stack with safety. And in the hay harvest, should the farmer be induced, from the uncertainty of the weather, to carry his hay too soon, a small quantity of Salt sprinkled upon each layer of the rick

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* I think it necessary to remark, that where Salt is used as a top-dressing for grass land, the quantity employed ought to be much less than is commonly used for ground that is to be afterwards ploughed for a crop of grain. Six bushels, or three hundred and thirty-six pounds of Rock Salt, ground *very fine*, and regularly sown upon the grass, would be a proper quantity for an acre of pasture land; whereas sixteen or twenty bushels may be used upon fallows for cleaning the ground preparatory to the putting in the grain. For meadow land, two or three bushels of crushed Rock Salt may be carefully sown upon each acre, immediately after the hay is got in, with great advantage, especially in hot and dry summers.

† See Appendix Nos. 21, 39, 42, and 78.

‡ See Appendix Nos. 15, 29, and 37.

§ The late Dr. Darwin, in treating on Salt as a manure, remarks, that "as it is a stimulus which excites the vegetable absorbent vessels into greater action than usual, it may, in a certain quantity, encrease their growth, by enabling them to take up more nourishment in a given time, and perform their circulations and secretions with greater energy." See Appendix No. 79.

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will prevent the hay from becoming mow-burned,* as it is called; and when hay which has been thus treated is presented to horses and cattle, it will be preferred by them to that which has been put together in a more favourable season, and not treated with Salt.

The *cleanliness* of Rock Salt as a manure is likewise another considerable advantage. In many cases this circumstance will be found to be very important, particularly in the grazing districts.† It has repeatedly been observed, that if land be manured with dung *after* the hay has been carried off, the neat cattle will refuse to eat the eddish which grows upon such land. On the contrary, if a field be dressed with about two bushels of fine Salt per acre instead of dung, soon after the hay is cut, this inconvenience and loss will be avoided, and a large crop of aftergrass will be obtained, possessing such peculiar sweetness, that all kinds of cattle, as well as horses, will eat it with the utmost avidity.

The farmers, in some districts, are accustomed to steep their seed-corn in lime-water, and doubtless the practice is often useful; but I am decidedly of opinion that a strong brine, made by the solution of Rock Salt in water, will be infinitely more efficacious. Crops of wheat are often reduced one-half in value by a disease to which this kind of grain is very liable, called the *smut* or *rust*;‡ but when the seed has been properly prepared with Salt, this misfortune can never happen.§ It has also been proved by some public spirited individuals,

* See Appendix Nos. 26. 45, 64, 57, and 58. † See Appendix No. 26.

‡ I am desirous of recommending to my readers' perusal a very valuable paper, which has lately been distributed gratis by the Board of Agriculture, written by the Right Honourable Sir John Sinclair, Bart. "on the means of preventing the rust in wheat by the use of Salt," an object well entitled to be ascertained by decisive experiments.

§ See Appendix No. 4.

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who have made the necessary experiments, that the scab is never found upon potatoes which have grown upon land that has had a proper dressing of Common Salt.*

In many parts of Flanders, but more particularly at Lisle, it is the practice to preserve the urine of those cattle that eat Common Salt with their food. This is preserved in appropriate reservoirs, and when the farmers apply it to a certain description of land, which experience has taught them to select, the effect, even without any other manure, is not only advantageous, but it is truly astonishing.†

Enough, I presume, has now been offered to induce you to expect a satisfactory result from the application of Salt to your fields‡ and meadows; I shall, therefore, at present, content myself with informing you, that in the Appendix you will find a list of the names of those gentlemen who have borne testimony to the efficacy of Salt as a manure,§ and likewise the evidence of a respectable individual who has used Common Salt upon his own farm for many years, and has witnessed the use of brine upon the lands in his neighbourhood for forty years, with the greatest advantage; and who came from a distant county on purpose to attend the select committee of the House of Commons, to report to them the substance of his experience for that very long period.‖ You will also there find the proposals of the Board of Agriculture in London, and of the Highland Society of Scotland, both of which institutions are fully aware of the value of Rock Salt in the cultivation of land, for they have offered rewards to such persons as shall give them an account of the best experiments with this valuable mineral

* See Appendix No. 39. † See Appendix Nos. 13, 18, and 75.
‡ See Appendix No. 25. § See Appendix No. 41. ‖ See Appendix No. 78.

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substance, in the different branches of farming, and general agriculture.

We proceed now to the second part of our subject, which relates to the application of Salt in feeding sheep and horses, and for assisting in fattening live stock. Here, however, I shall merely enumerate the several advantages which appear to have resulted from the practice, and shall then place my chief reliance on the effect which may be produced by your perusal of the several documents which are contained in the Appendix.*

To ascertain the exact quantity of Salt which may be necessary for the different kinds of land, and to appreciate the benefits which result from its employment in all the various modes of culture that are adopted in this country, will require several long series of experiments, especially as some of the evidence given before the committee of the House of Commons was unsatisfactory and contradictory;† but the advantages which have arisen from giving Salt to sheep and cattle are so determinate and self-evident,‡ that there appears to me to be nothing to prevent every farmer from immediately adopting the practice.

The most undeniable evidence has been afforded, that Common Salt uniformly promotes digestion§ in horses‖ and cattle, and that this occasions them to make a rapid progress in fattening.¶ It has also been found, that in feeding with chaff or cut straw, a larger quantity of this cheap and ordinary food can be given when sprinkled

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* See Appendix Nos. 43, 46, 47, 51, 58, 59, 60, and 64.

† See Appendix No. 80. ‡ See Appendix Nos. 55, 60, and 74.

§ See Appendix Nos. 44, 45, 52, 59, 64, and 79.

‖ See Appendix Nos. 53 and 78.

¶ See Appendix Nos. 43, 45, 46, 48, 52, 54, 59, 60, 71, and 76.

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with Salt than can be administered in any other way;* and that as the filling the stomachs of cattle while fattening is a circumstance of the greatest importance, a very large portion of chaff, if seasoned with Salt, may be given with the utmost advantage to the growth and health of the animals. Thus, every experimental grazier knows that an abundance of very ordinary food, if eaten with relish, will fatten cattle much sooner, when given with a small allowance of substantial provender, than better food alone in a moderate quantity. There is, indeed, hardly any food that can be offered to cattle, which, if mixed with Salt, will not be eaten with eagerness. Hence, nothing can be of more importance to a practical grazier than to know how to obtain this valuable saline mineral substance, at a cheap rate, and with little difficulty.

It was given in evidence last year, before the select Committee of the House of Commons, that in feeding cattle, fourteen pounds of chaff, such as is produced in winnowing corn, and which of itself is of little or no value, will, when properly moistened, and heated by steam, and mixed with two ounces of Salt, save forty-two pounds of turnips.† Surely this is a most important circumstance in the economy of a farm. Is it possible that this fact should pass unnoticed by any agriculturist?

A friend of mine, in the year 1812, travelled through the United States of America, from the state of Massachuset to the River Mississippi. He observed that it was usual, throughout that extensive district, to put Salt within all the stacks of hay, and likewise to sprinkle it among the hay, in the proportion of about fourteen pounds of Salt to one ton of hay.‡ He says it was

* See Appendix No. 75. † See Appendix No. 75.
‡ See Appendix Nos. 42, 45, 57, and 58.

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also a common practice in that country to give Salt to sheep and cattle, and that he has frequently seen cattle follow a boy a mile or more, who held a portion of Salt in his hand, tempting the animals by showing it to them.* The same individual assures me also that since his return to England he has adopted the same practice, mixing Salt with his own stacks of hay, and with the mashes to his horses,† and constantly with the same benefit.

That horses, sheep, and cattle, would derive benefit from Salt, might, indeed, be imagined from observing the great desire they discover for it, and which manifests itself in every country where this mineral substance lies within their reach.‡ This is certainly the case, and in the Appendix many undeniable examples will be given to support the opinion.§ Several most curious facts, that were stated by a very respectable member of the House of Commons, to prove the salubrious effects of Salt upon these animals, may also be seen in the Appendix.‖

It cannot then be doubted that Salt, when judiciously administered to live stock, assists their digestion, preserves them from disease,¶ and improves their condition; and from the evidence to be hereafter adduced, it will appear that the milk and butter produced from those cows which have Salt given to them is more abundant,* and never acquires that turnip-flavour† which is generally so predominant in the milk and butter from those cows which are kept upon turnips *without* Salt. It has likewise been proved, that Common Salt is a certain cure

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* See Appendix Nos. 48 and 64.
† See Appendix Nos. 53 and 55.
‡ See Appendix No. 1.
§ See Appendix Nos. 44, 48, 55, and 64.
‖ See Appendix Nos. 73 and 75.
¶ See Appendix Nos. 49, 51, 55, 56, 57, 59, 60, and 75.
* See Appendix Nos. 12, 49, and 61
† See Appendix Nos. 1, 55, 60, and 73.

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for the botts in horses,* and is a specific against the rot in sheep;† and that the wool‡ is materially improved of such sheep as are fed with Salt.

It is impossible, I conceive, to read the great body of evidence which was delivered to the Honourable the Board of Trade,§ and to the Committee of the House of Commons, without being convinced that the benefits resulting to the grazier and agriculturist, from the employment of Salt, must be great and important; especially the evidence of John Christian Curwen, Esq. the representative in parliament for the city of Carlisle, who is himself a large farmer and grazier, and who stated to the committee, that upon a farm of one thousand pounds a-year, he could not estimate the annual advantages, that might fairly be expected from the free use of Salt, at less than three hundred pounds.‖

If the benefits and profits arising from the unrestrained use of Salt in agriculture be so various and considerable, how comes it to pass, it may be asked, that its employment has not been universal throughout Great Britain? Various reasons may be assigned for this; amongst others, we may state the unwillingness which farmers in general evince, especially the lower class, to walk out of the old beaten path of their forefathers; the want of directions how to make use of Salt for the purposes under consideration; the enormous duty upon the article itself; and, perhaps, above all others, next to the price, the many vexatious regulations to be observed before a remission of any part of the duty could be obtained.

Let us take one case as an instance of these trouble-

* See Appendix No. 42. † See Appendix Nos. 47, 60, 65, 74, and 79.
‡ See Appendix Nos. 46, 50, 55, and 60. § See Appendix Nos. 66, 67, 68, &c.
‖ See Appendix No. 75.

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some obstructions. By an act of parliament passed in the 57th year of George the 3rd, it was enacted that the farmer might receive Salt for the purpose of mixing with the food of sheep or cattle, at the reduced duty of five shillings per bushel, or ten shillings per cwt. such Salt to be employed only and for no other purpose than feeding sheep or cattle; but before any such Salt could be obtained, it was necessary to give a bond, with sufficient sureties, to the satisfaction of the Commissioners of his Majesty's Excise, in the penalty of six times the full duty upon such Salt; and no farther quantity of Salt could be obtained, however much the cattle, after being long accustomed to it, might require its use, until the bond given on the delivery of every prior quantity should be discharged.

It was also enacted that before such bond could be discharged, a certificate must be given, declaring the whole of such Rock Salt to have been used and consumed in mixing with the food of sheep or cattle, and for no other purpose whatever; and that no such certificate should discharge any such bond, unless the collector of excise should, upon enquiry, *be satisfied of the truth thereof,* and should underwrite the same upon the said certificate. The act declared also, that if such certificate should not be signed and delivered to such collector before the expiration of thirteen months from the time of the bond being given, or should in any respect be false, or any of the Salt should be consumed in any other manner than in feeding sheep or cattle, the penalty of the bond should be forfeited.

Under such penalties and restrictions,* is it at all

* See Appendix Nos. 76 and 77.

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surprising that Salt has not been more generally employed for the purposes above enumerated; especially when it is recollected that even, under all these disadvantages, the farmer could not use a single bushel of Salt for curing his hay, for steeping his seed-wheat, or for manuring his land, until he had paid the enormous duty of thirty pounds per ton, which of itself amounted to a prohibition?

I have, however, great pleasure in being able to congratulate you that an act passed both Houses of Parliament on the fifth of June last, to repeal the most vexatious of these restrictions, and to impose a low duty upon such Rock Salt as should be hereafter delivered for *any purpose of agriculture*, as well as for feeding sheep or cattle.

Under this act of parliament, Salt may now be had at the reduced duty of two shillings and sixpence per bushel, or five shillings per cwt.* for any of the following purposes, viz. for mixing with the food of sheep or cattle; for steeping seed-corn; for preserving hay; or for manuring land; and no bond is required to be given, nor any sureties as heretofore, for the faithful employment of the Salt so obtained. And although the farmer must give a certificate that he has consumed the Salt in the way the act directs, it is not necessary that time should be lost, as heretofore, while the collector makes

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* Rock Salt is not worth more than ten or twelve shillings per ton at the pits of Northwich, and it may be put on board a vessel on the canal for about five shillings per ton more. Persons may be supplied with any quantity of Salt on the best terms, and agreeably to the regulations of the late act of parliament, by applying to Mr. William Horne, a respectable and public spirited merchant in Liverpool, who has lately been elected an honorary member of the Board of Agriculture in London, for his zeal in promoting agricultural experiments with Rock Salt. See Appendix Nos. 22 and 39.

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enquiries to satisfy himself of the truth of the allegations in the certificate, but he is bound to accept the same when presented, and the farmer is entitled to receive a further supply of Salt immediately.

By this important act of parliament, the farmer is also allowed to remove any part of such Salt to another farm, or to sell it to a neighbouring farmer for the purposes aforesaid; and notwithstanding the penalty on a *fraudulent* misapplication of the Salt is fixed by this act at forty shillings the bushel, or at one hundred pounds, according to the determination of the person who shall sue for the same, still the act contains a proviso, that the penalty may be mitigated by a justice of the peace to one-fourth part thereof.

Such are the alterations which have been made in the laws respecting the use of Rock Salt in agriculture; and it does appear to me that every farmer who has it in his power to purchase Salt should immediately procure a quantity, and make such experiments upon his land and with his live stock as shall appear to him to be most likely to increase the quantity and value of his produce, I am extremely anxious that a great number of agriculturists should immediately enter upon these experiments, because, in my estimation, this Concession of the legislature is the greatest boon that the government has ever offered to the acceptance of the landed interest of this country; and if the occupiers of the land, after the late extraordinary exertions of the select Committee of the House of Commons for their benefit, should discover an indifference or disinclination to accept of the proffered gift, those *interested* persons who are enemies to the total repeal of the laws relating to Salt will avail themselves of this circumstance as an argument against the advocates

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for the repeal; and the whole of the late Salt laws will soon be re-enacted in all their original force and severity. Whereas, if experiments were very generally instituted throughout the country, I doubt not but the farmers would soon become so fully convinced of the value of Salt for the various purposes of husbandry, that a general application would be made to parliament for a total repeal of all the laws relating to Salt; and such a petition as this would be irresistible. The agriculturist and manufacturer would then be empowered to dig Rock Salt with as much freedom as they can now dig sand, or raise coal; and the various national benefits which would result therefrom would be more numerous and important than could easily be enumerated.

Having addressed you at much greater length than I at first intended, all that remains for me now is, that I should give a few necessary cautions and directions to such of my readers as may determine to adopt the practice which has been recommended in the foregoing pages.

In the first place, I am desirous of remarking that no land can be said to be fruitful which is entirely exhausted of carbonaceous matter; therefore, if it were possible for an estate to be so worn out by successive crops that little or no carbon remained in the soil, it is not likely that Salt alone would restore it to its original fertility. I consider also that the land which contains most carbon will derive most benefit from the application of Salt. But the safest way for a farmer to proceed is to use his Salt sparingly at first, and in all cases to leave a small portion of the same land without Salt, so that the real effects produced by the Salt may be, by comparison, in every instance, self-evident and palpable.

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A farmer who does not wish his land to lie fallow,* ought, undoubtedly, to use *too little* rather than too much Salt; because a very abundant dressing of this saline mineral substance might render the land, for one year at least, absolutely barren.† We read in scripture of the "Valley of Salt," where David smote the Syrians, which in all probability was an extent of low land that had been rendered barren by an influx of salt-water. In one of the very early numbers of the Philosophical Transactions is an account of a valley of the same kind near Aleppo; and the late Dr. Brownrigg relates that there is a vast desert on the frontiers of Russia, towards Crim Tartary, which, in consequence of a superabundance of Salt, has become so absolutely sterile, that for the space of many miles neither tree nor herb grows upon it.

This reminds me of a circumstance of primary importance to all those who obtain Salt under the regulations of the late act of parliament. This act enjoins that the Salt shall be delivered in lumps of twenty pounds each or upwards; consequently the whole of such Salt must be broken before it can be used with any advantage, for wherever Salt is accumulated upon land, it must inevitably destroy all vegetation that lies beneath it.‡ Now it has occurred to me that there is a possibility, from the carelessness of a labourer, of its being sometimes spread upon the land without being properly broken; and I am decidedly of opinion, that wherever a *lump* of Rock Salt falls, whether upon arable or pasture land, it must do mischief. My advice therefore is, that

* See Appendix Nos. 25, 36, and 66. † See Appendix No. 66.
‡ See Appendix Nos. 32, 33, 42, and 66.

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the proprietor of a farm, when he receives a parcel of Rock Salt, should make a point of having the whole of it ground, or reduced to a powder nearly as fine as common table Salt, and *passed through a sieve of the requisite fineness,* before he allows any of it to be laid upon the ground. Rock Salt is not a hard substance: it may easily be crushed and divided as much as is necessary for any of these purposes.

As to the quantity of Salt which it will be adviseable to use for the respective crops, and upon the different kinds of land, this will be best learnt by a perusal of the several testimonials and other documents which will be found in the Appendix.* But the best way of all others for ascertaining this point would be for every agriculturist to depend upon the results of his own experiments.† To this end, I would advise him to institute a set of experiments upon every distinct species of grain which he is in the practice of cultivating, as well as upon his pasture land,‡ and to keep a register of every minute circumstance attending each of these trials.

A large kitchen garden,§ wherever there is one attached to a farm-house, would in some cases be the most appropriate spot for such experiments; as this would be more under the immediate eye of the proprietor, and the experiments being upon a small scale, would be attended with little or no expense. The circumstance of an agriculturist being now empowered to divide the Salt which he shall obtain by permit, among as many of the neigh-

* See Appendix Nos. 16, 25, and 35. † See Appendix Nos. 19 and 21.

‡ The Right Honourable Sir John Sinclair, Baronet, lately published a series of sixteen distinct experiments, which he is desirous of having tried by farmers, as best calculated to ascertain the advantages of using Salt in agriculture; and he distributed the paper gratis. This valuable sheet, which may be obtained at the Board of Agriculture, is well deserving the attention of all practical men.

§ See Appendix No. 27.

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bouring farmers as he may think fit, is extremely favourable to such circumscribed experiments, and will be very gratifying to those who may wish to satisfy themselves of the value of Common Salt, and yet would not like to incur the risk of buying a large parcel solely for their own use. And as the late act allows the use of Salt in *agriculture*, as well as for feeding cattle, this affords a large scope for its consumption.

FEW FARMERS or GRAZIERS, I flatter myself, will read the foregoing pages, and the Appendix, without feeling some desire to improve their own estates, and increase the value of their live stock by the use of Salt; but should there be any who are incapable of feeling a desire for improvement, I trust there are, on the other hand, many country gentlemen, and enlightened agriculturists, who rejoice in every opportunity of contributing towards the national improvement of Great Britain, and who will entertain the subject from principles of pure patriotism.

It was the opinion of Aristotle, "that the cultivation of the land is favourable to liberty." And a writer of more modern times remarks, "that well ordered monarchies are most frequently found in highly cultivated and fruitful countries." There was an adage formerly in vogue, that "fields covered with ears of corn are the sources of victories." "The Sardinians," says the President Montesquieu, "were formerly very rich; and

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Aristeus, so famed for his love of agriculture, was their law-giver. But the Carthagenians becoming their masters, destroyed every thing proper for the nourishment of man, and forbade the cultivation of the lands upon pain of death." The state consequently fell into decay, and for ages became the prey of a variety of conquerors. What is most remarkable, however, is, that even to this day the greatest part of the Island of Sardinia remains an uncultivated barren waste.

To this deplorable state of things the Chinese dominions afford a striking contrast.* "The ancient Emperors of China," says Montesquieu, "were not conquerors. The first thing they did to aggrandize themselves gave the highest proof of their wisdom. They raised from beneath the waters (or rather, they recovered from the sea) two of the finest provinces of the empire. These owe their existence to the labour of man; and it is the inexpressible fertility of these two provinces which has given Europe such ideas of the felicity of this vast country." And, from the united testimony of travellers, we have reason to believe that every part of this extensive empire is constantly preserved in the highest possible state of cultivation; whereas, in England and Wales alone, there are upwards of seven millions of acres of waste land, which have been for ages, and still continue to be, of little or no benefit to the community.†

The greatest obstacle to the cultivation of these lands is the want of manure, there being at present a great insufficiency for the lands which are already enclosed.‡ Let the use of Rock Salt, however, become general in

* See Appendix No. 30. † See Appendix Nos. 29 and 30.
‡ See Appendix Nos. 25, 26, and 28.

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agriculture, and this deficiency will in a great measure be supplied. Every opulent farmer will then have the means within his reach of putting the whole* of his farm into the most desirable state of improvement; so much so, that it would soon be considered disgraceful for any agriculturist to allow a single rood of land belonging to his estate to remain uncultivated. This would prepare the way for the enclosure of those vast tracts of common land which we perceive in every quarter of the United Kingdom; and the alteration which this would make in the face of the country, to say nothing of the increase of its inhabitants, may be more easily conceived than described.

Had our ancestors been totally inattentive to the improvement of agriculture, the greatest part of Great Britain would still have been covered with wood; and in like manner, had it not been for the progress of civilization, and the desire of improvement, the finest provinces of France and Germany would still have been overshadowed by the Hercynian forest, which, in the time of Julius Cæsar, extended from the borders of Alsatia and Switzerland, over the greatest part of Germany, Hungary, and Transylvania, and was said to be sixty days journey in length and nine in breadth.

"Agriculture," said the late amiable Mr. Hollinshead, "is the most certain source of domestic riches. Where it is neglected, whatever wealth may be imported from abroad, poverty and misery will abound at home. Such is and ever will be the fluctuating state of trade and manufactures, that thousands of people may be in full employment to-day, and in beggary to-morrow. This

* See Appendix No. 25.

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can never happen to those who cultivate the ground. They can eat the fruits of their labour, and can always by industry obtain, at least, the necessaries of life."

However true these observations may be, thank God the times in which we live are propitious to every kind of improvement; to the progress of science, as well as to the advancement of the arts; and the spirit of enquiry which is abroad throughout the kingdom, will, I trust, induce many hundred intelligent agriculturists to attend seriously to the important points upon which I have addressed you.

Allow me to add, that I am confident those of you who feel any solicitude upon the subject, cannot more effectually consult your own interests, or those of the community at large, than by entering immediately upon such experimental researches as are best suited to your respective situations and convenience, as your success, whatever it may be, will be equally conducive to individual and national prosperity.

I am, Gentlemen,

Your most obedient servant,

SAMUEL PARKES.

Goswell-Street,
London, Feb. 22, 1819.

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APPENDIX.

EXTRACTS FROM ANCIENT WRITERS ON THE EMPLOYMENT OF COMMON SALT IN AGRICULTURE, AND IN FEEDING CATTLE.

1. PLINY, the naturalist, seems to have known little or nothing of the use of Salt in agriculture; but he was well aware of its virtues in feeding cattle. "Herds of cattle," says he, "being covetous of a salt pasture, give a great deal more milk, and the same is much more agreeable in the making of cheese, than where there is no such saline ground." *Pliny's Nat. Hist. book* 21, *chap.* 7.

2. John Glauber, an eminent chemist of Amsterdam, who published several esteemed works on the practice of chemistry about two hundred and fifty years ago, was so thoroughly convinced of the economy of using Salt as a manure, that he obtained a patent from the government of the United States of Holland for the sole disposal of the privilege of applying this valuable mineral to the barren lands in that country. The following brief extracts from his work, entitled "The *Prosperity of Germany*," will be sufficient for our present purpose.

"Salts of no great cost are to be had in vast quantity, with which, corn being macerated, and sown in barren lands, and in such as are not dunged, doth come to perfect maturity: and this I have tried not only once, but oftentimes; and have also proposed to bring it into public use in these united provinces: to which end the most Supreme Orders, general and provincial, have granted me a privilege or patent for many years; whereby it is forbidden to sow or plant barren, sandy ground after this kind of way without my consent. The main basis of the knack lies in Sea-Salt, which may be plentifully had in these places, to fatten lean and dry ground with instead of dung." *English Translation in folio*, London, 1689, page 388.

3. John Jonston, a learned Polish naturalist and physician, who travelled over every kingdom of Europe, and was esteemed everywhere by the learned, has an entire chapter on Common Salt, in which he writes thus: "Also fields, whereupon Salt is sprinkled, become fruitful by it, as experience makes good.

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It destroys worms in animals." Jonston's *History of the wonderful Things of Nature.** The English translation, folio, London, 1657, page 94.

4. Gervase Markham, a learned writer in the reigns of James the First and Charles the First, who was equally noted for his skill in many foreign languages, and for his knowledge of the various branches of agriculture, published a great variety of treatises on the management of land,† and closed his agricultural labours by the publication of a work entitled "*Markham's Farewell to Husbandry*," in which the following passages occur.

"If you be neer unto any part of the sea-coast, thence fetch great store of the salt-sand, and with it cover your ground which hath beene formerly plowed and hackt, allowing unto every acre of ground threescore or fourscore full bushels of sand, which is a very good and competent proportion; and this sand, thus laid, shall be very well spread and mixed among the other broken earth. And herein is to be noted, that not any other sand but the salt is good or available for this purpose, because it is the brine and saltnesse of the same which breedeth this fertility and fruitfulness in the earth, choaking the growth of all weeds, and giving strength, vigor, and comfort, to all kind of grain or pulse, or any fruit of better nature."

"Now methinks I hear it objected, what if the ground do lye so farre within the land, that there is no salt-sand within many score miles of it, how then shall I make good my barren earth? To this I answer, that albeit this salt sea-sand be of infinite good and necessary use, inriching grounds wonderfully much; but if your ground lye much within land, and farre from the sea, then to every acre of land you shall take two bushels of very dry bay-salt, and in such manner as you sow your wheat you shall sow this salt upon the ground; then immediately after the sowing of the salt you shall sow your wheat, which wheat would be thus prepared before you sow it. The day before you are to sow your grain, you shall take bay-salt and water, and mixing them together, make a brine so strong that it will bear an egge; then put the wheat you are to sow into that brine, and let it steep therein till the next day; then drain it from the brine and so sow it; and no doubt but you shall find a marveilous great increase thereby. Neither is the thing itself without good

* He also published a "Natural History of Birds, Fishes, Quadrupeds," &c. in 1653, folio; also a work upon the Hebrew and Greek Festivals, in 1660; and some volumes upon other subjects.

† Markham, in 1616, published "Liebault's La Maison rustique," or the Country Farm, which sometime afterwards was translated into English by Dr. Surfeit. Besides this, he printed a book entitled "Cheape and good Husbandrie; also the Use and Profit of Bees, the manner of Fish-ponds, and the taking of all sorts of Fish." London, 1656. Another thin quarto, entitled "The Inrichment of the Weald of Kent, or a Direction for the true ordering and manuring all the Grounds within the Wealds of Kent and Sussex." London, 1660. And several other works, which were held in great estimation.

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and strong probability of much increase, and strength for the bettering of all manner of arable grounds; for there is nothing which killeth weeds, quicks, and other offences of the ground, so much as saltness."

In chapter V. entitled "of the ordering of all barren clays that are over-run with ling or heath," after giving directions how to make and dress the land, he adds, "And if the ground have been sanded (with salt sea-sand) you may sow your seed-wheat simply of itself, without any doubt of the plentifull increase thereof; but if it have not been sanded, then you shall not only steep your seed in brine, but also you shall mixe your seed with bay-salt, and so sow it into the ground."

In the chapter which treats of the method of recovering such land as has been rendered sterile by the overflow of sea-water, Mr. Markham writes thus:

"In all my former relations, touching the bettering of ground, I do apply, as one of my chiefest ingredients, salt-sand, salt-weeds, salt-water, salt-brine, ashes, and many other things of salt nature, as indeed all the manures and marles whatsoever must either have a salt quality in them, or they cannot produce fruitfulnesse; so that it might be argued, if Salt be the occasion of fruitfulness and increase, then there cannot be much hurt done by these overflowes of the salt-water, that it should rather adde a fattening and enriching to the ground, than any way to impoverish it. But experience shews us the contrary, and that there is nothing more noisome and pestilent to the earth than the *superabundance* and too great excess of saltnesse, &c."

In the chapter on enriching of barren grounds for the growth of hemp and flax, he directs first to plough it, "then with the salt sea-sand you shall sand it very plentifully, but if that be not to be gotten, and you be very well assured of the natural richness of the earth, you shall then sand it with the best red sand you can find near unto you; and upon every acre of ground you thus sand with fresh sand, you shall sow three bushels of bay-salt, and then plough up again the earth, sand and salt together, which should be done about the latter end of the yeare, as after Michaelmas, and so let the ground rest till seed-time, at which time you shall bring sea-weeds to your hemp land, and cover it all over with the same, and then you shall plough it again, burying the weeds within the earth. As for the weeding of this ground, you shall not respect it at all, for *it will put up no weed.*"

In the chapter on vermin, Mr. Markham says. "The next great devourers of grain are pismires or ants, which, although it be but a little creature, yet it is so laboursome, that the grain which they carry away or destroy amounteth to a great quantity. If you manure your corn lands with ashes or salt sand, you shall be well assured it will never breed pismires."

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5. Sir Hugh Platt, a writer of some eminence in the time of Oliver Cromwell, states it to be his opinion that it is Salt which makes all seeds to flourish and grow; and that no dung which is laid on barren ground could any way enrich the same, if it were not for the salt in it." see his *Jewell House of art and nature*." Folio, London, 1653, chapter 104. Some other extracts from this curious volume have already been given in the foregoing letter, page 17.

6. Mr. Christopher Packe, the translator of the works of John Rudolph Glauber, and an eminent chemist of the seventeenth century, speaks very decidedly of the virtues of Common Salt in agriculture. Having made some observations on Mr. Glauber's processes for mixing lime and Salt, he proceeds to give the following directions respecting the mode of applying the Salt, which are quaint enough, but I shall give them in his own words.

"The lime," says he, "must be spread upon the ground where no rain can come to it, till it slake itself by the air, and fall into a powder. Of this powder you are to take four hundred weight to one hundred weight of any Common Foul Salt, which is too impure for the use of the kitchen, where such may be had, otherwise Clean Salt (for that will be *cheaper* than dung): the Salt and lime are to be well mixed, and then moistened with such a quantity of water as will bring the lime and Salt mixed to the consistency of a stiff mortar. Of this mass balls are to be made about the bigness of ones fist, and laid under a shed or hovel to dry; being dried, they are to be burnt in a kiln as lime is, so that the balls may be red hot for an hour at least.* When the balls are burnt, they are to be again placed upon a floor under a shed or hovel where they may be exposed to the air, but kept free from the rain, and if you break them with a clodbeater presently, the air will the sooner act upon them, and cause them again to fall into a powder, which powder may then be carried out and spread, or rather sowed out of a *seedlet*, thicker or thinner as the land shall require; which joining itself with the earth, is again attracted by the seed when it is sown, whose growth is thereby swiftly promoted, and its multiplication much augmented."

7. The great Lord Bacon, who flourished early in the seventeenth century, having noticed the advantages which the farmers of Cornwall, Devon, and other maritime counties, derived from the free use of sea-sand, which upon those coasts chiefly consists of broken shells impregnated with salt-water, declares that the best manure next to marle is sea-sand, which no doubt (says

* This direction for burning the mixture may have been consistent enough with the prevalent notions of the time, but the Salt would doubtless be equally efficacious without that operation.

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his Lordship) obtaineth a special virtue by the salt water, and concludes by affirming that Salt is the first rudiment of life.—*Nat. Hist. Cent.* 6, *Exp.* 596.

8. The eminent Mr. Evelyn, in his discourse on the effects of the overflowings of the river Nile, asserts, that "Salt is the vigour and close of all things; the first and last of all elemental bodies; the *quid divinum*, and original of all fecundity."—*Philosophical Discourse of the Earth, page* 103, *&c.*

9. The celebrated Anthony De Leuwenhoek, who was a Fellow of the Royal Society, in his observations on the storm which happened in the year 1704, when many of the banks of Holland were broken down and the country overflowed, addresses himself to his countrymen in the following manner:—"There are some," says he, "that affirm, that the scattering of this salt water by the storm will do a great deal of harm to the fruits of the earth; but, for my part, I am of a quite different opinion, for I believe that a *little* Salt spread over the surface of the earth, especially where it is heavy clay ground, does render it exceedingly fruitful; and so it would be if the sand of the sea were made use of for the same purpose."—*Philosophical Transactions, No.* 289. The year following, the Dutch had the largest crops of grass and of corn that had been known for many years before.

10. In the Philosophical Transactions, is a memoir by the Archbishop of Dublin on the manuring of lands in the counties of Londonderry and Donnegall, in Ireland, with sand and shells from the sea-shore, from which I extract the following passages. Treating of boggy land, he says:—"The turf is nothing but the product of vegetables, which rotting, there remains only the earthy parts: now shells being chiefly salt, the salt incorporates with the sulphur of the plants, and renders them fit for the vegetation of new plants, which further appears from this, viz.—that those shells which have been under the salt-water are much better than such as lie dry on the strands. Some thousands of acres have been improved by these shells, and what formerly was not worth a groat per acre is now worth four shillings. Some years ago they made lime of the shells, and manured their lands with it, but a poor man, who, from laziness or poverty, had not provided to make lime, threw the shells unburnt on his land, and his crop proved as good as his neighbours, and the second and third crop better; and all took the hint, and have used them so ever since. Where shells are not to be procured, sea-wrack or sea-sand supply the want."—*Philosophical Trans. No.* 314.

11. Soon after the formation of the Royal Society, Dr. Bury delivered a memoir, containing an account of the manuring of land in Devonshire with sea-sand, which is much to our pur-

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pose. "Salt," says he, "quickens dead land, and is used in the south-west part of that county, which would otherwise be the barrenest, but is now the richest part thereof. The inhabitants go as far as the sea will permit them at lowest ebb, take the sand in bags, and carry it on horseback fourteen miles into the country, and spread it on the land, thereby improving it both for corn and grass. Crude Salt alone, if strewed upon the ground, does not improve but corrode it; the Sea-Salt is too strong and active of itself unless mixed with lime—how to mix them, Glauber directs."—*Philosophical Trans. No.* 316.

12. Dr. Cox, in his memoir, printed in the Philosophical Transactions, on the manuring land with sea-sand, writes thus: "The effect it usually produces where much of this sand is used, is, that the seed is much and the straw little. I have seen," says he, "in such a place good barley, where the ear has been equal in length with the straw it grew on. After the corn is cut, the grass, though it be but short, yet as to feeding, giving good creams, plenty of milk, and all other good purposes, far exceeding the longer grass, where less sand is used."—*Philosophical Trans. abridged*, vol. ii. page 730.

13 Dr. Plott, the author of the topographical histories of Staffordshire, Oxfordshire, &c. when treating of the husbandry of his own time, says:—"At Nantwich they yearly brine their fields, from which they find a more profitable return than from any soil or dung."—*Nat. Hist. folio, page* 39.

EXTRACTS FROM MORE MODERN WRITERS ON THE USE OF SALT IN AGRICULTURE.

14. "I am well assured from a Scotch gentleman, that they have long used Salt in that part of Great Britain, always sowing ten or twelve bushels by hand of their coarse Salt on an acre of young green wheat, sometime in November, December, January, or February, it being, from the several accounts which I have had of it, very effectual in the *killing of tender weeds* amongst corn, yet at the same time *cherishing the corn;* and though it does not add altogether to the bulk or height of the straw, yet it does much to the goodness and plumpness of the grain. And whoever has been curious in their remarks abroad will find that it is the usual practice of the Milanese to sow Salt on their pastures, as I have been informed by one who has sold great quantities for that purpose; as also by a merchant of

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Liverpool, who is well acquainted with that trade, who affirms that the finest crops they have of hemp and flax amongst the Dantzickers and others, who raise those commodities in those countries, are from lands on which Salt is strewed." *The Practical Husbandman*, Octavo, London, 1733, vol. i. page 48.

15. "Salt certainly sweetens the grass much; and it may on all such occasions be mixed with a proper quantity of dung, which is more sulphureous than Salt, and will make grass shoot away much faster than any other manure. Lime in its own nature makes grass *sour*, but when mixed with Salt, that acidity will be taken away."—*Practical Husbandman*, vol. i. page 57.

16. "As to the proportion of Salt to be used on land, it ought to be according to the nature of it; cold, wet, clayey land requiring more, and loose soft land, though it be poor, requiring less. Again, the proportion of Salt ought to be either more or less, according to the crops of grass or grain you would improve. For cold, wet, and spewy land, ten loads of dung, six of earth, and eight bushels of Salt, per acre.

"For lean, hungry, sandy land, fourteen loads of pond-earth, six loads of dung, and six bushels of Salt per acre when employed for corn and grazing.

"For meadow land, fourteen or fifteen loads of dung, five bushels of Salt, and four of pond-earth, the quantity of each to be altered according to the quality of the ground." *Practical Husbandman*, London, 1738, page 59.

17. "Thus have I made out what I proposed, viz.: that every acre of land in England which wants to be improved, may be done ten or twelve shillings an acre cheaper by Salt than any other way. Suppose then, that out of the forty millions of acres of land which are calculated to be in England and Wales, there is but one-eighth part, which is five millions, to be improved every year; and that one-half of those five millions may be manured by some other manure, there yet remains two millions and a half to be done by Salt still; which, reckoning the savings at ten shillings per acre only, (the expenses being about the same) comes to one million two hundred and fifty thousand pounds; which, if the old proverb be true, that so much saved is so much earned, then that sum is a real addition to the landed interest of Britain; and this calculation is not at all disagreeable to what is affirmed by some Cornish and Devonshire men, when they say that the money laid out in salt sea-sand, for the improvement of lands in those two counties, comes to thirty-two thousand pounds per annum." *Practical Husbandman*, vol. i. page 63.

18. "On watering meadows with a solution of Salt, we are directed to make a large pit about twenty or thirty feet square,

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and five or six feet deep, more or less, as there will be occasion, in the method tan or salt pits are made, and put therein ten or twelve bushels of salt, and as much of lime, soot, or any other ingredient of that kind, and, having a pump near at hand, or some conduit or spring of water, fill the pit up by degrees, at first to three or four feet high, letting the ingredients dissolve in the water, by being there twenty-four hours at least, stirring them sometimes about, and after that, by dipping in of the finger it will be found whether the water is salt enough (as near as you can to the strength of sea-water): if it is not sufficient, then may be added a reasonable quantity more of the above mentioned materials; but if it be too salt, then more water may be poured in till it is just right and fit for use; and being possessed of a moving pump or a skip, pump the water into a hogshead, with a leather pipe, and a watering rose at the end of it, just as is practised in watering the streets in London, and so (having the hogshead placed on a roll) may both meadows and corn land be watered to a good advantage." *Practical Husbandman*, vol. i. page 74.

19. "To shew an acquaintance of mine the effects and advantages of Salt properly applied to vegetables, I made the following experiment, in an extreme dry summer, upon a bare piece of pasture land, out of which the cattle were all taken for want of grass: I marked four places with stakes, each of which I watered nine nights successively, in the following manner:—the first with spring water alone, to the quantity of a gallon; the second with the same quantity of water, adding an ounce of common salt; the third and fourth with the same quantity, mixing the water in the third place with two ounces of salt; and that in the fourth with three ounces, which produced the following different effects.

The grass in the second place grew more and of a darker green than that in the first; in the third, it only grew by spots, for part of it was killed where the greatest quantity of water fell, and the fourth was quite brown for a greater compass than the third; by which it appeared that an ounce of salt in a gallon of water had a better effect than the water had alone; and that three ounces of Salt, mixed with a gallon of water, was more than the grass could immediately receive; but the fourth place in the ensuing spring was the most fertile of them all."—*Treatise of Fruit Trees*, by Thos. Hitt, 8vo. Third Edition, London, 1768, page 17.

20 "Soils which are subject to the grub, and must be fertilized by common dung, which is a proper nest for the mother beetle to deposit its eggs, must be well impregnated with the brine of dissolved salt, after the dung is first cut up: two large hogsheads of salt will make brine enough for a dung pan of fifty

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feet square. This cure for the grub is a late discovery, for which I am obliged to a judicious planter, and which I have tried with success."—*From an Essay on Plantership by Samuel Martin, Esq. of Antigua.*

21. "Having tried Salt upon a small scale on a sandy soil, I can assert sixteen bushels to be a proper quantity for one acre. It gradually advanced in its effects to sixteen, and as gradually diminished to forty bushels when vegetation was destroyed. Twice only have I had an opportunity of buying a few tons of foul Salt, and used it both times on a barley tilth, sowing the Salt immediately after the barley. The event was perfectly satisfactory. The verdure of the spring exceeded any thing of the kind I ever saw; and the ripened appearance was whiter by many shades than I ever beheld. N. B. Salt is noxious both to weeds and vermin." R. Legrand, Esq. *on Manures, in the Annals of Agriculture*, vol. v. page 149.

22. Some Extracts form a Pamphlet entitled "Hints to Country Gentlemen and Farmers, on the importance of using Salt as a general Manure." By the late John Hollinshead, Esq. of Chorley. 3rd edition, 1802.

"Salt," says Mr. Hollinshead, "will be found to be the cheapest, best, and most durable manure ever yet made use of: and for the readier distribution of this most excellent manure through the kingdom, the public and enterprising spirit of the nation has of late years provided very ample and cheap conveyances to almost any part of the country, which the gentleman and farmer can wish, by means of the numerous navigable canals, which are either finished or projecting in almost every direction. Salt may be laid on the banks of the *Staffordshire* canal at fourteen shillings per ton: from whence, by means of the Oxfordshire Grand Junction, and other canals, it will with the greatest ease be conveyed to any part of the south of England, at a very trifling additional expense.

"Suppose a farmer to live twelve or fifteen miles distance from any canal, navigable river, or part of the sea-coast (which in general, perhaps, will be found to be the greatest extent he can have to fetch it), from whence he can import Salt for the benefit of his lands; even at that distance his team will fetch a load of Salt in one day, say at the expense of ten shillings; and with that team he will convey home one ton of salt; therefore, for fourteen shillings, the original price of the Salt, five shillings (more or less) for the freight by the canal, river, &c. and ten shillings for the carriage home, he lays in his own field manure sufficient for two acres and a half of land, at the small expense of one pound nine shillings. What a vast superiority, in point of expense, this would have over all the manures now in use; for lime, dung, or marle, even where most plentiful, on account of their

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great bulk, cost more in the single article of cartage, without regard to the expense of buying, or digging for them, than the whole charge of salt when laid upon the ground.* Besides, as so *small* a quantity of Salt in weight will serve for manuring lands, this is no inconsiderable recommendation, because on that account it may with ease be conveyed to the *most rough, steep, and mountainous* parts of the country, to which the bulky and heavy manures now in use could not be carried, but with infinite labour, and at an expense far exceeding all the advantages to be expected from it."

23. "That Common Salt is an excellent manure, experience, the most satisfactory of all evidences, clearly proves. It was used round Northwich, in Cheshire, as a manure, so long as foul Salt was permitted duty free, with very great success."

24. "Nothing in nature is so powerful as Salt, to meliorate and drain strong and stiff soils, and also to give moisture to dry ground: it is also a certain destruction to weeds and insects. Besides its efficacy on corn and fallow grounds, its excellent qualities in giving luxuriance and salubrity to grass lands are peculiarly worthy the attention of the grazier and breeder of cattle."

25. "When a farmer intends to fallow a piece of ground, he ought first to sow it with such a quantity of Salt as would be sufficient to *destroy* all vegetation, viz. forty bushels per acre; † which, by cutting and dividing the viscous substances which are in the earth, would reduce it into a proper state to become food for plants. The farmer must take notice, that this Salt is to be sown on the ground sometime before he begins to work his fallows with the plough (the autumn will be the most proper season), in order to give the Salt sufficient time to destroy the grass and other roots upon it, before he begins to work it. The Salt being thoroughly mixed and incorporated with the soil, during the spring and summer following, whilst the land is on the plough, will, by the time the seed is sown upon it, be reduced to that strength which is the most proper for effectually and vigorously assisting and supporting vegetation while the seed is on the ground, and such lands will be found to produce a crop superior to those under any other mode of cultivation.

"This method of sowing the intended fallows with Salt will, therefore, serve very much to lessen the labour of the husbandman in working his grounds; for the tough and adhesive clods and lumps which are generally so troublesome, especially upon

* This goes on the presumption of Waste Salt being allowed the farmer duty free; but even with the present duty, a ton of Rock Salt, containing forty bushels, may be put on board a boat on the canal for six pounds.—S. P.

† I think it necessary to remark upon these directions, that I believe the writer is here, and in the former extracts, speaking of *foul* Cheshire Salt, such as at that time was allowed to be used for land. Therefore in using Rock Salt only half the quantities which he mentions ought to be employed.—S. P.

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clayey soils, will be so completely broken and dissolved by the operation of the Salt, as to give much less obstruction to the harrow at the first working.

"In deep, loamy, dry earth, upon which wheat has grown, after the crop is got in, the land should be ploughed, and lie in that state until the spring, when it must be cross-ploughed and wrought fine with the harrow, and planted with potatoes: as soon as the potatoes are covered with earth, then sow or spread sixteen bushels of Salt per statute acre upon them; and when they are dug up in the autumn, then sow a crop of wheat again, taking care to pick all the potatoes clean out, that they may not injure the wheat in the following spring by growing up amongst it. By this method of cultivation, a crop of wheat, and another of potatoes, may be produced alternately on the same ground *for ever*, instead of losing a whole year's produce, according to the old custom, whilst the land is in fallowing.

"For other corn lands sown in the usual way, after a spring ploughing, the best method will be to sow sixteen bushels of Salt per acre, immediately after the grain is covered in by the harrow; this, by meliorating the soil, destroying weeds and insects, and attracting moisture, will produce an abundant crop; and, by sowing ten bushels per acre *annually*, these lands will ever after be exceedingly productive.

"There is still a further advantage, which is highly worthy the farmer's attention, which is, that by having constantly a plentiful supply of such a cheap manure, he can always keep his grounds in a condition fit to receive any kind of grain which he would wish to sow upon it, which at present is far from being the case: for instance, if he now wishes to sow a crop of wheat, he cannot do it without lime or marle; if he would plant potatoes, it cannot be done without a large quantity of dung, which, if it is of his own producing, he will impoverish his other lands while he enriches this: if he buy it, it must be at an enormous expense, and also to the proportionate injury of the district from whence he procures it, where it ought to have be expended; and therefore, though it should enrich an individual, it will not be of the least advantage in a public point of view, which undoubtedly ought principally to be attended to in things of this nature. Also, when a person enters on a poor farm, unless he be possessed of a larger capital than usually falls to the lot of this useful class of mankind, with all the industry and management of which he is master, his lease, nay even his life, may be expired before he has manured one-half of his estate, and generally speaking, the parts which he first tilled will be reduced to their former poverty, before one-fourth of the farm has received any benefit.

"But if he were permitted the use of Salt, duty free, with a very moderate some of money, he would have it in his power, in a few years, to bring his farm into the highest state of culture

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and fertilization; so that at all times he would be enabled to bring to market those articles, which his situation, or the particular necessity of his neighbours, pointed out as most beneficial to himself.

"Another considerable advantage would arise to the occupiers of small farms in particular, and especially those with large families, from manuring with Salt, as they would be enabled to raise, not only a much greater *quantity*, but also a much greater *variety*, of the common necessaries of life, from the same extent of ground. For example:—a man who rents a few closes of land, gets, perhaps, nothing but milk and butter from his little farm, whilst he has the most substantial part of the sustenance for his family (bread) to buy, generally at a high price. But give him Salt duty free, and he may pitch upon *one* field, which, with the assistance of this manure, will produce him abundant crops of grain annually for ever, whilst his other fields will remain unmolested, and, if also salted, covered with the most luxuriant and wholesome herbage for the use of his cattle. At present, if he ploughs at all, it must be in rotation, or, as the farmers term it, in *shifts*; and by that means he is constantly injuring his grass-lands.

"When Salt is used upon pasture-lands, it may either be sown upon them in its simple neat state, after the rate of sixteen bushels* the acre, or mixed with compost, mud, or loamy earth; sixteen bushels of Salt to twenty loads of earth, and turned in the heap two or three times to incorporate it properly; this compost should be laid on and spread in the autumn."

26. "For meadow-lands, we would advise the farmer to sow *six* bushels of Salt per acre, immediately after the hay is got in. This would be found peculiarly beneficial in hot and dry summers, and upon lime-stone and sandy soils; which, after they are mown, are often so much parched by the heat of the sun, that not only the eddish is destroyed, but also the crop of the ensuing year is very materially injured; but by sowing it with Salt, moisture would be attracted and retained, sufficient to assist vegetation so powerfully, as in a short time again to cover the face of the ground with grass, and by that means effectually to screen the roots, which would otherwise be too much exposed to the direct rays of the sun.

"It may, indeed, be said, that dung will answer the same purpose: in some degree it might, but dung cannot always be had, never in sufficient quantities: besides, if it could, this objection lies against it, that neat cattle will not eat the eddish after dung, consequently one valuable crop is lost to the farmer,

* I think it necessary again to caution the farmer against using this quantity of *pure* salt upon grass-land, as it would probably burn up the grass. The writer speaks all along of *foul* waste Salt, from the Salt Works, which was seldom more than one-third of it real Salt.—S. P.

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which, if Salt were used, would be both productive and wholesome. Also, the hay, when put into the mow or stack, should be sprinkled with Salt on every layer. When hay is housed soft, this should never be omitted, as it would prevent what the farmers call the *mow-burn*, and make the hay far more pleasant and nutritious for the cattle in winter."

27. "Mr. Beck, gardener in Chorley, has constantly made use of Salt in his garden for upwards of thirty years, principally upon his onions; and he has invariably found the Salt to exceed every other kind of manure which he could have used for the like purpose. His method is to sow the Salt immediately after the seed is covered in. But as he never had any thought of communicating his observations and experiments to the public, he took no care to ascertain the exact quantity necessary to be sown on an acre, and proportionably upon any smaller quantity of ground: yet he thinks, if he might hazard a conjecture, that he has not sown *less*, and probably *more*, (of waste Salt) than *sixteen* bushels per acre. One year, by way of trial, he sowed the usual quantity of Salt upon a plot of onions, *after* they had begun to shew themselves above ground, and the crop, so far from being improved, was entirely spoiled; from this he infers, that the experimental gardener, who may be inclined to make use of Salt, will do well to throw it on as soon as possible after the seed is sown."

28. "The only manure that can be procured in all places is dung (lime and marl being entirely local, and confined to certain districts); and how insufficient it is to answer all the purposes of husbandry, need not here be insisted upon, since it must be plain to the most superficial observer. Let us turn our eyes for a moment to the generality of breeding and grazing-farms, and see in what state they are. The dung that can be raised from the produce of the farm is all expended upon a few acres of meadow-land, whilst the pasture-grounds are destitute of every kind of improvement. This is no idle speculation; for which way so ever we turn our observation, we shall find abundant proofs of the truth of the assertion--thousands and ten thousands of acres lying in the same state, with regard to any actual improvement that has been made in them, in which they came out of the Creator's hands, and must inevitably remain so, unless some other manures are introduced into practice, besides those which are now in use.

"What a misfortune to the dairy must this neglect of the pasture-grounds be! and this too is the ground upon which the occupier must principally rely; for it is well known, that during the summer months, whilst his cows are at grass, is the time in which he chiefly produces his butter and cheese; and yet this ground is entirely neglected. Whilst the demand for those articles is daily increasing, we are indifferent whether their productiveness be proportioned to that demand; by which inatten-

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tion the price of those commodities has, in a few years, been doubled. And what shall bring them to their former price? *Manure these pastures with salt.* By this means we shall increase their produce two-fold, and consequently decrease the price of those necessaries of life nearly in an equal proportion. This would be an unspeakable advantage and comfort to the labouring poor, at the same time that it was enriching both the farmer and land-owner.

"I know some will say that there are many soils which cannot be improved. I deny the assertion. Let but the farmer be properly encouraged to make the trial, and I am convinced he will not find his labour lost. If our ancestors had always been indifferent to agricultural improvements, what must have been our situation at the present day? We might have lived upon the haws and berries of the field; for nature has not been so lavish in her gifts to this country as to some others: few of the necessaries of life will thrive and flourish without the most unremitting industry. *By nature our apples are crabs, and our plumbs sloes!* but art and nature have changed the scene: and health giving exercise, properly directed, and duly encouraged, would bring the kingdom to an unexampled pitch of plenty and splendour.

"The proper cultivation of the soil is an object so peculiarly interesting to the community at large, that those who industriously attend to it are perhaps to be esteemed the most meritorious citizens of their country.

"Of such importance are the study and practice of agriculture in Scotland, that they have instituted a professorship in one of their universities; and it is much to be lamented that a similar institution is not introduced into our universities, as it would essentially tend to the promotion of this most important department of knowledge, so highly beneficial to mankind."

29. "It is proved by the general returns of the number of inhabitants in *England* and *Wales*, that there has been an increase of two millions (or nearly one-fourth of the whole) during the last century. Then, as population and manufactures are rapidly increasing, is it not of the utmost consequence that we should have a proportionate increase in the productions of the earth?

"With proper encouragement to and management in agriculture, I have no hesitation in affirming that the generality of land, in most parts of England, might be made to produce double crops in a very little time; and with the addition of Salt as a manure, instead of importing corn from abroad, to the great disadvantage of the nation, we might make our own produce not only sufficient for home consumption, but also to supply the wants of our neighbours. I need not insist on the advantage to be derived from such an improvement, not only to the farmers, but to the public at large, for it is well known to every commercial man of what importance it is that our merchants should

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always have it in their power to undersell their rivals in foreign markets: this, however, it will be impossible for them to do, even if there be no advance in the price of the raw material, unless by bringing down the price of provisions we proportionably keep down the price of labour. And no other mode can be adopted so likely to accomplish this most desirable end as the general use of Salt for manure.

"We shall just mention one thing more in support of what has been advanced respecting the benefits of Salt for manure, which falls within every farmer's notice, but which, probably, has not struck him in that light in which we are about to represent it. Cattle kept in a straw-yard, without any thing but straw for their sustenance, yield a poor light manure, little superior to natural soil; whilst cows or oxen feeding on good hay, assisted by corn, oil-cakes, or other invigorating food, produce manure of the best kind; thus the stronger the manures are impregnated with Salts, of more value they are."

30. "We have at least *seven millions* of acres of uncultivated land in this kingdom! What a loss to the community must this be! Here is ground sufficient, if properly cultivated, to furnish all the inhabitants of the country with bread, lying entirely waste, whilst they are paying a double price for the necessaries of life! Let us not neglect the advantages which providence has so kindly put in our power: the means of relief are within our reach, if we are not wanting to ourselves. If half the money that was necessarily and humanely spent during the late scarcity, in bounties on the importation of grain, had been laid out in inclosing waste lands, and giving premiums to farmers, I am convinced that in any future unfavourable season we should not be obliged to rely upon a scanty and precarious supply of grain from other countries, but on our own granaries at home, which have been well stored in a time of plenty by the wholesome produce of our native soil.

"If we turn our eyes to the empire of *China*, we shall there see the beneficial effects of a due attention to agriculture. The population, upon an average throughout that vast empire, amounts to the surprising number of three hundred inhabitants to every square mile; that is, nearly three times the population of this country; and yet these people are maintained in plenty, without any assistance from other nations. How this is accomplished, Sir George Staunton, in his elegant and authentic account of Lord Macartney's embassy to *China*, informs us. 'The whole surface of the empire,' says he, 'is, with trifling exceptions, dedicated to the production of food for man alone. Few parks and pleasure-grounds are seen except those belonging to the emperor. Little land is taken up with roads, the chief communication being by water. There are no commons or lands suffered to lie waste through neglect, or the caprice or

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for the sport of great proprietors. No arable land lies fallow. And whatever defects there are in the soil, it is supplied by mixture with other earths, by manure, by watering, and by careful and useful industry of every kind.' Let us copy after so useful an example.

"The present high price of Salt, encumbered as it is with heavy duties, is such as to prevent all attempts of the farmer to ascertain its real utility by experiments. In order to do away this inconvenience, we sincerely hope the legislature will take this matter into its further consideration, and repeal the duty upon Salt, as the only thing that can effectually promote the proper improvement of the country.

"The Salt Rock in Cheshire lies about thirty-six yards below the surface, in thickness from ten to forty yards; it extends twelve miles in length, and several miles in breadth: and throughout the whole district springs arise, which are made into Salt. This rock, together with those which are in Worcestershire, &c. are sufficient to supply the whole kingdom *for ever*, without any fear of their being exhausted; and, if properly applied, are a treasure far greater than the gold mines of Mexico and Peru."

31. "The following account we had from Mr. Thomas Sutton, of Middlewich, in Cheshire. 'About twelve years since I dug up,' says he, 'a quantity of earth out of a field where a new building was going to be erected, in which there was some appearance of Salt-springs, the water from which had oozed up through the soil, and left an incrustation composed of the particles of Salt upon the surface of the ground. This soil, together with the Salt contained in it, I mixed with horse-dung: after it had lain some time in the heap, I spread it upon a piece of meadow-ground, which has been mown ever since, without any other manure having been laid upon it; and the other part of the meadow has been manured in the usual way every second year, and yet is now in no better condition than that which was covered with the Salt and dung twelve years ago."—*Mr. Hollinshead's Hints to Gentlemen, &c.* Page 5—33.

32. "A farmer at Glasson, near Lancaster, has for some time been in the habit of carting Salt-water to put upon his dung whilst in the heap in the yard, before it was taken to be spread upon the ground, which he has found by experience very much enriches the dung, and makes it better manure. A great advantage might also be derived to the farmer from spreading sea-sand under and amongst the dung, whilst it is in collecting, during the winter, and also in the cow-house, stable, and yard, not only on account of the particles of the Salt contained in it, but likewise by its retaining and absorbing the urine of the cattle, which is itself a very excellent manure."

"A farmer in the county of Sussex, some years ago, had a field, one part of which was very wet and rushy, and the grass

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produced upon it was of so sour and unpleasant a kind, that the cattle would not graze upon it: he tried several methods to improve it, but to little purpose; at last, having heard of the benefits of Salt as a manure, he determined to try that; for which purpose he procured a quantity of Rock Salt, which in a random way, without any regard to the precise quantity, he threw upon this rushy ground, fencing it off from the other part of the field; the first effect of which was a total disappearance of every kind of vegetation. In a short time after, however, it produced the largest quantity of mushrooms ever seen upon an equal space of ground in that county. These in the spring following were succeeded by a most plentiful and luxuriant crop of grass, far exceeding the other part of the field in the richness of its verdure and the quickness of its growth: the cattle were remarkably fond of it; and though the Salt was laid on it *upwards of twenty years ago*, this part is still far superior to the rest of the field."—*Appendix to Mr. Hollinshead's pamphlet*, page 33—35.

33. Mr. Wedge, in his agricultural survey of the county of Chester, says, "foul Salt is a most excellent manure, either for pasture lands or fallows: and it is much to be regretted that so large a quantity as seven or eight hundred tons should annually, in Cheshire alone, be lost to the community. The heavy duty laid upon refuse or dirtied Salt prevents its use for manure.

"A difference of opinion," continues he, "having been entertained as to the utility of Salt as a manure, we insert the following experiment, which we have been favoured with by a gentleman of Northwich: In a meadow, where the after-grass being of a coarse, rank nature, which the cattle refused to eat, Salt was laid upon a part of the meadow, and the cattle have ever since preferred the grass growing on that ground to every other part of the field, and eaten up every blade. He also states that the good effects of Salt are particularly seen by mixing it even with the coarsest manure, and then laying it upon the land."

34. The late Thomas Butterworth Bayley, Esq. who was a Fellow of the Royal Society, and honorary member of the honourable Board of Agriculture in London, in his "Thoughts on Manures," after enumerating nineteen different substances which improve land, adds, "there is another source of improvement LOST TO THE COUNTRY, but *not through the fault of the farmers*, viz. refuse Rock Salt, and refuse liquor from the salt-works. I trust the very impolitic restriction which forbids the use of this valuable manure, and causes its *total loss*, will soon be removed by the exertions of this society, and those of the honourable Board of Agriculture." *From an Address read to the Members of the Agricultural Society of Manchester, October 22, 1795.*

35. "Salt is the mother of all manures, as every kind of manure is higher or lower in value according to the Salt it pro-

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duces; and every kind of manure is portioned out to the land according to the quantity of Salt or nitre it is thought to have in it. Formerly, Salt was thought to be an impoverisher of land, but experience has taught us wisdom: it is now found to be otherwise, provided it is duly proportioned to the state the land is in, and mixed to mollify it as follows: take ten bushels of Salt, and six bushels of dry ashes, and mix all together; then spread them on the land, and harrow them in with the seed: this is a sufficient dressing for an English acre, as it is better to repeat the dressing than to lay too much on at once. By being thus mixed, one particle incorporates and mollifies the other. Salt itself is rather too severe and harsh in its nature, and if laid too thick on, might prove of bad consequence; but if conveyed into the earth by a soapy, smooth method, will prove the real enricher the earth wants to send forth vegetation: this dressing will last for three crops. Sea-weed, shells, fish, sea-water, sea-sand, have in them a proportion of salts, and, therefore, must be esteemed a manure."—From C. Varley, Esq. *communicated to the Chester Chronicle by the Rev. B. Dacre of Mosely, near Manchester.*

36. "After draining a piece of sour rushy ground, about the middle of October, some refuse Salt was spread upon a part of the land, after the rate of eight bushels to the acre, and in another part sixteen bushels. In a short time the vegetation disappeared totally; and during the month of April following, not a blade of grass was to be seen. In the latter end of the month of May, a most flourishing crop of rich grass made its appearance on that part where the eight bushels had been laid. In the month of July, the other portion produced a still stronger crop; the cattle were remarkably fond of it, and during the whole ensuing winter, (which is ten or twelve years since) and to this day, the land retained, and yet exhibits, a superior verdure to the neighbouring closes.

"A gentleman lately carried a small quantity of couch-grass roots and other rubbish harrowed off his land to the Salt Works, and laid it for some time upon the ground, where the foul Salt, by the direction of the officer, is destroyed; he then carried it back, and mixed it with other manure. His barley and his hay-grass were strong from this composition, beyond his most sanguine expectations.

"Its effects on fallow-land are equally advantageous. By sowing it at the time of breaking up the lands for a fallow, its strong saline quality destroys vegetation and every noxious insect; but by being mixed sufficiently with the soil before the wheat is sown, it adds a strong nutriment, and ensures the best of crops." Dr. Holland's *Agricultural Survey of the County of Cheshire.*

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37. The following impressive expostulation is said to be from the pen of the Right Honourable Lord Erskine.

"The science of agriculture is by no means at its height; and in the almost miraculous advance of chemistry, new means may be found from the concentration of known composts, and the discovery of new, to lessen the cost of culture, and to increase its returns. But here again your revenue stalks like a ghost across my path which ever way I turn; as otherwise you have a superior unbounded source of improvement trodden under your very feet, and cast as refuse into your rivers, beyond all that chemistry is ever likely to discover. You have SALT in endless abundance, but your *necessity* turns it into *money*, even to forty times its value, instead of spreading it abroad for various uses, to rise up in property which no money could purchase.

"Do you know what Salt alone would do for you? Can you be so ignorant as not to know, that by taking the tax upon it *directly as money*, you rob yourselves of fifty times its amount in the production of your soil, in your fisheries and manufactures, and in the universal prosperity of the country?

"Lime, which has caused to start into life the most inert and sterile parts of Great Britain, is just nothing as a manure when compared with SALT, which differs from it besides in two remarkable qualities decisive of its superior value.

"Lime, and I believe all other known composts, are powerful only according to the quantities in which they are used; whereas Salt to be useful must be sparingly applied; it *corrupts* vegetable substances when mixed with them in *small* quantities, but *preserves* them when it *predominates in a mass*. It is needless, therefore, to add, that, independently of its comparative lightness, the expense both of the article and its carriage must be very greatly diminished. Yet you rob the mother of your people of this food which indulgent nature has cast into her lap, sufficient, as you will see hereafter, to feed all her children, even if their numbers were doubled." *Armata*, part 1. page 169.

38. "Salt answers best as a manure for green crops, especially for turnips and clover. It is not of much benefit to barley or wheat, if sown; but in compost it proves very advantageous; using thirty Cornish or forty-five Winchester bushels per Cornish acre, which is larger than the statute acre, nearly in the ratio of six to five. Prepare the ground for turnips, and sow the Salt a fortnight before the seed, or longer, if a larger quantity of Salt is used."

Mr. Seckler, at Henver, in the parish of Gwinear, has just applied Salt in the above proportion to poor exhausted land; being clay, inimical to turnips: the effect has been a heavy, rich crop, which I have had an opportunity of seeing. It is such a one as a hundred tons of dung per acre would scarcely produce in the same land. The Salt employed is that which is considered refuse, after having cured the fish, and been condemned by

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the excise. Over this they throw some dirt, and it is then sold to the farmers by the fish-curers. If the duty were taken off Salt, for every bushel now used there would be at least a hundred bushels employed for this purpose. It has been said that the value of refuse Salt, as manure, depends upon the soil and animal matter which adheres to it; but the farmer knows from experience, that that Salt is to be preferred which has cured only one bulk of fish; and they give a higher price for it than for that which has been twice employed, and which consequently contains more animal matter. Where an estate has been salted for two or three crops, the effects are visible for at least seven years. It has a particular tendency to convert poor and light soils into firm and adhesive ones, 'giving them body.' Among the farmers there is a general scramble for the refuse Salt, to try who can get most of it by purchase.

"The following curious anecdote may be related as serving to illustrate the effect of Salt: Mr. Seckler made a little heap of earth in the midst of a field, on the top of which a cart load of refuse Salt was thrown; the earth in the heap itself, and (after its removal) the earth under it, for upwards of two feet deep to the clay, was rendered so perfectly barren, that the most common weeds would not vegetate in it. This barren earth, however, furnished the richest dressing for the remainder of the field. Mr. Seckler found Salt the best preservative against the mildew in wheat. When the wheat followed turnips with Salt, it escaped the mildew which attacked other fields which were not salted; and this he finds to hold universally good, as far as his experience goes. The improvement of bad hay, by Salt applied in the proportion of about one hundred weight* to three tons, and sprinkled between the layers, is very striking, preventing mildew, and rendering it more grateful and beneficial to cattle, especially if the hay is bad: and even in good hay it is very greatly ameliorated. A testimony in favour of the benefit of Salt is furnished by the striking fertility of the land in the neighbourhood of the sea-shore in Cornwall; more especially in those situations which are favourable to the general distribution of the saline spray, as is exemplified in the parish of Fennor." Sir Thomas Bernard's *Case of the Salt Duties*, page 272, *communicated by Dr. Paris, late of Penzance*, but now of Dover Street, London.

39. "Notwithstanding the excessive duty, numerous experiments have been made, and almost invariably with uniform success. An interesting detail from the Rev. E. Cartwright will be found in the fourth volume of communications to the Board of Agriculture, which is conclusive, as to the application of Salt as a manure for potatoes. It appears from this communication, that the experiment could not have been tried on a soil better adapt-

* This is foul fishery Salt: of pure Salt, a third of the quantity might be sufficient.

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ed to give impartial results. Of ten different manures which were resorted to, most of them of known and acknowledged efficacy, one only excepted, *Salt* was superior to them all. Its effects, when combined with soot, were extraordinary, yielding in a row two hundred and forty potatoes, whilst one hundred and fifty only were produced from the row manured with lime. It was observable also, where Salt was applied, whether by itself or in combination, the roots were free from that scabbiness which often infects potatoes, and from which none of the other beds (and there were in the field near forty more than made part of the experiments) were altogether exempt. And in Dr. Holland's Agricultural Survey of the county of Chester are clearly shewn the good effects resulting from its use on grass lands, and as a manure for wheat and barley. In the twenty-seventh volume of the Annals of Agriculture, there is a communication from Davies Giddy, Esq. of some interesting experiments on the use of Salt in the culture of turnips; by which it appears, that on a part of a field, which had been previously exhausted, half a crop of turnips was produced: but the crop totally failed in that part of the field where the ordinary manure was laid *without* Salt. In another instance, three acres of land, which in the preceding year had borne a crop of wheat, not exceeding twelve bushels on an acre, were ploughed before Christmas, and brought into fine tilth by the Midsummer following. On each acre were sown twenty bushels of Salt, excepting that two ridges towards the middle of the field were purposely left without it: on these two ridges the turnips totally failed; but the remainder of the field produced a plentiful crop. It is farther instanced, that four acres of land, completely worn out by successive tillage, were ploughed before Christmas; three acres were sown with Salt, at the rate of twenty-five bushels, and the remaining acre with eighteen bushels, without any other manure: the crop was in general a good one, but was visibly the best where the greatest quantity of Salt had been used. Crops of turnips were subsequently raised with equal success; and in the severe winter of 1794-5, it was much less injured by the frost than others similarly treated and cultivated in the common way."—*Letter to the Right Hon. Nicholas Vansittart*, by *William Horne, Esq.*

40. "Sea-sand is very generally used in the county of Cornwall for manure, and the quantity which is every season carried away from different parts of the coast for the purpose of manure almost exceeds belief. From Bude, in the parish of Stratton, it has been ascertained that in one day as many as four thousand horse-loads have been taken; and from the harbour of Padstow, it has been computed, that fifty-four thousand cart-loads are annually carried. The expense of land-carriage for sand, used in the county, has been considered as amounting at least to thirty thousand pounds annually."

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"That the beneficial operation of this sand depends upon the presence of calcareous matter there cannot be any doubt, but, at the same time, we are borne out by unequivocal facts, in believing that the Sea-salt, with which it is impregnated, contributes materially to its fertilizing powers." Dr. Paris's *Memoir in the Transactions of the Royal Geological Society of Cornwall*, vol. I. 8vo. London, 1818, page 193.

41. "It has been said, that the benefit of Salt as a manure has not been *demonstrated:* that neither the scale upon which it has been tried, nor the period for which it has been used, has been sufficient to remove *all doubt* upon the subject. The want of general use, however, and the paucity of experiments, are accounted for by the prohibitory duties which the Salt laws have imposed upon the use of it; and since that objection was urged on the part of the Excise, in April last, the production of Mr. Hollinshead's statement has added so much strength to the former proofs, as to carry them almost to moral demonstration. In other enquiries we balance the comparative weight of testimonies. The twenty-nine persons whom I have referred to, as having expressed their opinions in favour of the use of Salt as a manure, are many of them men of the first rank in point of science; all of them respectable in character, and with the advantage of practical knowledge. I add the list of their names: Bishop Watson, Sir John Sinclair, Dr. Darwin, Sir Rose Price, Colonel Scobell, Mr. Hollinshead, Mr. Davies Gilbert, Dr. Paris, Sir Hugh Platt, Mr. Alderman Farley, Mr. Jay, Mr. Ford, Mr. Bayley of *Hope*, Mr. Elliott, Mr. Rigg, Mr. Le Grand, Mr. Kingston, Mr. Boaze of *Penzance*, Major Taubman, Mr. Stephenson, Mr. Horne, Mr. Gilbert *of Wincham*, Mr. Hill, Mr. Wedge, Mr. Lee of *Oldford*, Mr. Beck, Mr. Sutton *of Middlewich*, Mr. Holt, and the Rev. Mr. Cartwright.* It is hardly to be conceived that they should all of them be misled, or have united to mislead the world upon the subject. I presume not to offer either argument or opinion, but merely submit to the reader facts and authorities,—quæ neque confirmare argumentis, neque refellere in animo est. Ex ingenio suo quisque demat vel addat fidem."—*Case of the Salt Duties*, by Sir Thomas Bernard, Bart. London, 1817, page 289.

42. Extracts from Papers published by the Right Honourable Sir John Sinclair, Baronet, on the Uses of Salt for Agricultural Purposes.

"Salt, if employed in *large* quantities, in its natural state,

* To this very respectable list the following names may be subjoined: Gervase Markham, Lord Bacon, Mr. John Evelyn, Dr. Bury, Dr. Cox, Dr. Robert Plot, Dr. Brownrigg, Mr. Thomas Hitt, Mr. C. Varley, Dr. Holland, Lord Erskine, I. Christian Curwen, Esq. Dr. Rees, Lord Kenyon, Mr. Arthur Young, Mr. William Johnson, Mr. James Manley, and the late worthy Sir Thomas Bernard himself.—S. P.

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is hostile to vegetation, yet it operates advantageously, in various ways, when judiciously applied to arable land. In large quantities it has a tendency, like every other excessive stimulant, to disorganise and destroy the vegetable substances with which it comes in contact; but in *moderate quantities* it promotes the growth of vegetables.

"It has been proved by Pringle, and Macbride, that though Salt will, in large quantities, prevent putrefaction, owing to its antiseptic properties, yet that it has an evident tendency to promote the process, when used in small quantities. Hence the advantage of mixing it in moderate quantities with farm-yard dung, and other animal and vegetable substances.

"An experiment was tried in Cheshire, of mixing grass roots and other rubbish harrowed off the land with foul Salt: it was then incorporated with other manures; and the effects of this compost, on a crop of barley and grass seeds, is said greatly to have exceeded the most sanguine expectations that had been formed of it.

"A farmer mixed up a quantity of refuse Salt with the earth taken out of water furrows, and another portion of the same earth with lime. Of the two, the vegetation of that part of the field which had the *salt compost* laid upon it was by far the healthiest and most vigorous.

Vermin. "Salt destroys vermin in the ground, by making them void the contents of their bodies, such evacuations being too powerful for them to withstand. It has this additional advantage, that the vermin thus become food for those very plants, which otherwise they would have destroyed.*

Turnips. "Equal quantities of salt, and of turnip seed, were tried on a small plot of a garden, by the author of this paper; and the produce was more abundant than from the same quantity of turnip seed sown without Salt. The efficacy of Salt, as a destroyer of the turnip fly, or beetle, ought to be ascertained."

TESTIMONIALS ON THE EFFECT OF SALT IN FEEDING HORSES, SHEEP, CATTLE, &c.

43. There is no substance yet known which is so much relished by the whole order of graminivorous animals as Common Salt. The wild creatures of the desert are so fond of it, that wherever they discover a bank of earth impregnated with a small portion of Salt, they come to it regularly ever after to lick the saline earth. It is also admitted by all who have tried the experiment, that Salt given along with the food of domestic ani-

* Lord Dundonald on the Connexion of Husbandry with Chemistry. Page 138.

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mals (except fowls) tends very much to promote their health; and accelerate their fattening; and although some persons, who have been at a loss to account for the manner in which this stimulant could act as a nutritious substance, have affected to disregard the fact, yet no one has been able to bring the slightest show of evidence to invalidate the strong proofs which have been adduced in support of it. It is not, therefore, an extraordinary position to say, that by a proper use of Common Salt, the same quantity of forage might, on many occasions, be made to go twice as far as it could have done in feeding animals, had the Salt been withheld from them. If so, then we have here laid open to our view an easy mode of augmenting the produce of our fields to an amazing extent; for if the same quantity of forage can be made to go, not twice as far, but one-twentieth part only farther than it now does, it would be the same thing as adding one-twentieth part to the aggregate produce of meat for beasts throughout the whole kingdom."—*Dr. Anderson on Salt.*

44. "Salt provokes the appetite, strengthens the stomach, promotes the digestion and concoction of the aliments, resists putrefaction, prevents unnatural concretions of the humours, and is most friendly and agreeable to the human body, entering its composition as a necessary ingredient. No wonder, therefore, that the Laplanders, amongst whom the use of Salt is unknown, seem to discover the want of it by the exility of their bodies, and the weakness of their constitutions; being much less robust and strong than other northern nations who enjoy this excellent gift of God. Moreover, its uses extend to many other animals besides the human race: black cattle and sheep take a pleasure in licking it, and by it are preserved from many diseases; they also thrive to admiration, and quickly grow fat in marshy grounds that are frequently overflowed by the sea. And if we descend to the vegetable tribe, we shall find that Salt contributes greatly to fructify the earth; and when properly used as a manure, affords ample nourishment to corn and other vegetables; and renders kingdoms rich and fertile where it happens to abound in the soil." Dr. Brownrigg's *Art of Salt*, Octavo, London, 1748, page 157.

45. A Letter from a very considerable North American planter to the Editor of the *Museum Rusticum*, respecting the great Benefit of Salt to Cattle, with the method of using it. Extracted from the *Museum Rusticum et Commerciale*, London, 1764.

Gentlemen,

I do not find that the farmers in England know the great advantages which may be derived from the use of Salt in the business of fattening cattle; whereas, in America, we think it in a

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manner absolutely necessary, and accordingly give it to almost every kind of cattle; and those with parted hoofs are particularly fond of it.

Horses are as fond of Salt as black cattle; for with us, if they are ever so wild, they will be much sooner brought to a handful of Salt than any kind of corn whatever. We also give Salt to our sheep. To this practice of feeding with Salt, it is generally ascribed, that the American cattle in general are so much more healthy than the same animals in England: certain it is, that they are there subject to much fewer diseases. There is one very advantageous practice we have, which I cannot enough recommend to the notice of the farmers here in England: it is mixing Salt with our hay-ricks when we stack it, which we call *brining*.

Just before I left America, I had a crop of hay, which was in a manner spoiled by rain, being almost rotted in the fields; yet did this hay spend as well as if it had been got in never so favourably. When my servants were making up the stack, I had it managed in the following manner: that is, as soon as a bed of hay was laid about six inches thick, I had the whole sprinkled over with Salt; then another bed of hay was laid, which was again sprinkled in like manner; and this method was followed till all the hay was stacked.

When the season came for cutting this hay, and giving it to my cattle, I found that so far from refusing it, they ate it with surprising appetite, always preferring it before the sweetest hay, that had not in this manner been sprinkled with Salt. I have, in North America, some very considerable plantations; but having been for some time in England, I dedicate all my leisure hours to the study of Agriculture, and have regularly, since the first publication, taken in the numbers of the *Museum Rusticum*, with which I cannot but in justice declare myself perfectly well satisfied; and am of opinion it will be of great service, not in England only, but in America also.

I am, gentlemen,

London, May the 14th, 1764. Your constant reader,

AMERICANUS.

46. "In looking over the first volume of the Memoirs of the Royal Academy of Sciences at Paris, I met with a paper, entitled 'Physical Observations on the Effect of Salt in fattening Cattle.' The title excited my curiosity; and on reading the memoir, the author's reasoning appeared to me not only pleasing but convincing. His views are certainly enlarged, and directed to objects of the most important kind, viz. the improvement of land, and the increase of cattle. He lays it down as an axiom, or self-evident truth, that by increasing cattle, land may be improved; and by improving land, cattle may be multiplied.

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'The farmer,' says he, 'who has more than an ordinary stock of working cattle, reaps a double advantage; the one by having his work done in season; the other, by enriching the greater proportion of his land, by means of their additional manure.' The only difficulty is, how to maintain an increased number without increasing the expense; this, he asserts, may be done by the use of Salt, and advances the three following propositions:

"1st. That Salt given with the food of cattle augments the nourishment of that food.

"2nd. That in the proportion to the quantity of Salt eaten by cattle, the effects of that augmentation will be perceivable.

"3rd. That no ill consequence will follow from excess of Salt eaten by cattle, even though it should be given them without stint.*

"These propositions he endeavours to support by unquestionable facts.

"In the jurisdiction of Arles, in the county of Provence, there is,' he says, 'a district called the Crau, extending in length about six leagues, and breadth about three, the whole surface of which is covered with small rough stones, and not a tree or bush is to be seen in the whole district, except here and there upon the borders; yet on this spot, so seemingly sterile, by the free use of Salt, more numerous flocks of sheep are bred and reared than upon any other common of equal extent throughout the whole kingdom; and what is not less remarkable, the sheep are healthier, hardier, and endure the severity of the winter with less loss, though they have fewer sheep-cots for covering than those fed and bred in more copious pastures; and that have, besides, the advantage of more convenient shelter. Add to this, that the wool of the flocks bred and brought up in the Crau is not only the finest in the whole country, but bears the highest price of any in France. From hence he concludes, that it is to the unlimited use of Salt that these surprising effects are to be ascribed; for it frequently happens that the Crau is so burnt up in the summer, that the poor animals are forced to turn up the very stones to come at the few blades of grass that grow round them, and yet none perish for want of food. Let every excellence, therefore, that can reasonably be supposed inherent in the herbage be allowed to it, yet the quantity of it is so small,

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* From the trials which have already been made in feeding the live stock upon a farm, it appears that the following quantities may at all times be administered with perfect safety.

To neat cattle four ounces of Salt per day, mixed up with steamed chaff or other moistened food; one half to be given in the morning, and the other half in the latter part of the day. To horses four ounces per day, as aforesaid. To young heifers two ounces per day, at twice, as aforesaid. To calves one ounce per day, divided into two portions. To sheep two ounces per head per week. The Salt to be spread very thin upon slates or tiles, in the field where the sheep are fed.

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that without the abundant use of Salt, a fourth part of the sheep kept in the Crau could not subsist on it.

"But as a still farther demonstration that this astonishing effect is solely to be attributed to Salt, we have,' says the writer, 'in Languedoc, on the borders of the Rhone, a spot of the same kind of stony land, in every respect similar to that of the Crau, though in other respects it is no ways inferior; the wines and other fruits produced on the borders of both being in their goodness and other essential qualities equal.' Having proved his first proposition incontrovertibly, he proceeds to prove the second, to recommend an easy experiment, which it is in every farmer's power to make, and that is, to give one-half of his cattle Salt, and to the other half none: by this simple trial,' he says, 'in less than a month the difference will be discernible; the cattle to whom the Salt is given will shew it in their looks, in the sleekness of their coats, in their growth, and in their strength and firmness of labour. He adds, that with little more than half their usual food all these effects will be produced.

"To establish his third proposition, he appeals to the practice about Arles, where the cattle have as much Salt as they will eat; and none are so healthy, or thrive so fast, as those that eat most of it. 'To the above observations of our correspondent,' adds Mr. Young, 'we may state, that in Spain, where the finest wool in the world is produced, great quantities of Salt are given to the sheep; to which they attribute, in a great measure, the fineness of the wool. The Salt is laid upon the rocks, and the sheep come and lick it, and are exceedingly fond of it."—*Letter to Mr. Arthur Young in the 21th volume of the Annals of Agriculture.*

47. "We are not aware that the practice of giving Salt in its raw state to sheep is to be found any where in this kingdom except on our own estate (meaning the estate belonging to the Board of Agriculture); we shall therefore speak with due caution on the subject, confining ourselves to what has actually been done, and to the effect, which in several years' trial has been most apparent. The heavy duty now imposed on Salt seems sufficient to deter others from its use, as it for some time deterred us. At length we fortunately lost sight of this timidity: our motive was not to promote this or that imaginary effect, but to keep sheep in health. It was reasonable to conjecture, that the flock would demand more Salt in the autumn and spring months, when dews are heavy, than in the summer or dead winter months; and so it proves. In Spain a thousand sheep use in five months four arobes, or one quintal of Salt, which is one hundred and twenty-eight pounds. Their sheep would fatten at about thirteen pounds per quarter upon the average. This is the quantity given out, all of which may not be consumed. And as the price of Salt in that country is no object, more would have been given

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if more was necessary. Without reference to what was allowed in Spain (for the increased moisture of our climate, and the peculiar properties of our various soils, would not allow such a reference safely to be had) the quantity given to our sheep was such as we have before stated would keep them healthy, or such as they appeared to demand. It is given in the morning when the sheep are looked over, in order to counteract the ill effects of the dew. They have consumed at the rate of one ton of salt for every thousand sheep annually, amounting to thirty-six pounds sterling; the consumption of one thousand sheep might occasionally, but varying according to the season, amount to thirty pounds sterling per annum, and no more. A small handful of Salt is put on a flat stone or slate, and ten or fifteen of these slates, set a few yards apart, are enough for one hundred sheep; at first the sheep may be moved towards them; if they feel a craving for Salt they will lick up quickly as much as is necessary: if they do not want it, what remains dry when the sheep are next looked at is taken up and reserved for future use. Twice a week has been usually found sufficient: in particular cases it may be offered thrice. As to any doubt respecting their inclination to it, none can be maintained; for of a flock approaching to one thousand, there are not ten old sheep which have not taken kindly to it, and not a lamb which does not consume it greedily. When turnips in the early season are stocked with sheep, and the greens are rank and strong, many die suddenly, more especially two-tooth sheep. The disorder is a pent-up wind occasioned by excess of fermentation in the stomach: here salted hay and Salt are devoured with a greediness that denotes their salutary effect. The autumn of 1801 was rainy and unfavourable, yet *we did not lose one sheep* in turnips, and probably *never shall* whilst we persevere in the use of Salt. In that of 1802, we had many hundred fat weathers, gales, and hog sheep, in turnips, and lost two the first month the turnips were stocked. Certainly the chances were, that in any keep, and any season, of such a flock more might have died. In strong pastures likewise, when seasons are wet, the rot often spreads destruction over whole tracts of the country: here Salt must be beneficial, and an object of national importance. It is supposed, and with great truth, to correct acidity in the stomach; a disorder common to sheep even in Spain, but of a much more serious nature in the damp climate of Great Britain; more particularly when stocked on green floaty food, such as turnips, vetches, and young clover. Salt may not be a specific on land naturally unsound: such land it is madness at any rate to stock with sheep: but where the rot occasionally prevails, those who have carefully noted how Salt affects cattle, can hazard little in supposing that the disease will be much less heard of when such a corrective is applied. We must content ourselves rather with a negative

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than a positive proof, because it is not easy to ascertain how many sheep might have fallen sick or have died, which are now in health and alive; but it may be put to any flock-master, whether he would not consider himself a fortunate man, if at the expense of thirty pounds sterling per annum * he could materially improve the health and condition of a flock of one thousand sheep weighing fourteen pounds per quarter. His probable answer will be, that he would give double the money to secure to himself such an advantage."—Lord Somerville's *Communications to the Board of Agriculture.*

48. "Amongst all these animals there are some naturally better disposed to fatten than others; and care and attention are paid to giving a plentiful supply of food to those who are least inclined to fatten, in order to sell them at the same time, and to give them an equality with others to facilitate the sale: for this purpose Salt is added to their common food. This ingredient, of which they are very fond, gives them an appetite, excites thirst, and facilitates their digestion. There are various methods of administering it, such as hanging it up in a bag between two bullocks, who lick it after feeding, or melting it in the white water, the paste, or in the chesnut bread, or, in short, by giving them some handfuls of it, either on a board, or at the bottom of the troughs when empty."—Monsieur Juge, *on the Fattening of Bullocks at Limoges. Annals of Agriculture,* vol. xviii. page 17.

49. "In visiting Mr. Mosselman, who occupies a large farm at Chenoi, beyond Wavre, I was surprised to find a quantity of Rock Salt from Cheshire. He assured me that the use of it was of the greatest advantage to him, in three respects:

1st. "That by allowing the sheep to lick it the rot was effectually prevented.

2nd. "That his cattle, to whom lumps of it were given to lick, were thereby protected from infectious disorders; and the cows being thus rendered more healthy, and being induced to take a greater quantity of liquid, gave more milk; and

3rd. "That a small quantity pounded was found very beneficial to horses when new oats were given them, if the oats were at all moist."—Sir John Sinclair's *Agricultural state of the Netherlands.*

50. "That sheep are fond of Salt is beyond all doubt; it is equally certain that to these animals it is a preservative against many diseases, and, if I am not greatly mistaken, contributes in no small degree to render their wool finer."—Landt's *Description of the Faroe Islands.*

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* I have great pleasure in reminding the reader, that in consequence of the late reduction in the duty on Salt consumed in farming, a grazier may now derive all the benefits described by his lordship at the expense of SIX POUNDS. S. P.

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51. "There is a custom in Spain and Portugal, which I have personally witnessed the practice of in North America, of daily placing on stones, in the sheep pastures, some dry Salt for the use of the sheep. I have seen each of the sheep in his turn, and with eagerness, take a small portion of it. This is considered as a preservative against the rot, and as contributing to their general health and good condition. It is understood that a considerable part of the Salt, which we export duty free to America, is used for the purpose of Agriculture: though by the time it reaches the American farmer it costs him as much as two shillings and sixpence per bushel; and, I have no doubt, but in our humid and uncertain climate, and in the variety of our soils, it would, in small quantities, be found generally useful in preserving our sheep from the rot, and other complaints hitherto deemed inevitable and incurable.

"In Spain the cows are regularly supplied with a little Salt, and the increase of their milk, and the benefit which stable fed cattle derive from it, are confirmed by many authorities. A Cheshire gentleman informs me, that when he wants extraordinary exertion from his horses, he always gives them a little Salt; and this is analogous to the practice in the East, where the camels are allowed Salt during the passage of the caravans over the desert to Alexandria, as a support in the extreme fatigue they undergo."—Sir Thomas Bernard's *Letter to the Right Hon. Nicholas Vansittart.*

52. "The Onondargo is a fine lake of brackish water surrounded by springs, from two to five hundred gallons of the water of which make a bushel of Salt. It appears as if nature expressly intended this region to be populated; and, as a strong temptation, placed this treasure in the bosom of hills and woods. Had it not been for these and similar springs dispersed through the western country, Salt must have been at such a price as to deter persons from settling there. All the animals of those parts have a great fondness for Salt. The cattle of farmers, who give this substance to their stock, prove superior in value by twenty-five per cent. to such as are not supplied with an article so essential not only to their general improvement but their health. The native animals of the country too, as the buffalo, elk, deer, &c. are well known to pay periodical visits to the saline springs and lakes, bathing and washing in them, and drinking the water, till they are hardly able to move from their vicinity."—Ashe's *Travels in America.*

53. "In visiting Mr. Alderman Farley's Salt-works at Droitwich (17th August, 1817), I was struck with the appearance of an old black horse, that worked the machine for raising the brine. He was in very good condition, and his coat was like the finest black satin. I asked the old man, named Twigg, who had the care of him, what made the horse so sleek and plump:

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his answer was, that he had regularly given him a little Salt in his chaff three days in the week; about four ounces each of the three days; or if he was not very stout, then sometimes a little more; but that in general the horse was very well, and did his work well. He said he did not give him the whole four ounces at once, but at several times; about a table spoonful each time. The horse had been purchased by Mr. Farley about four years ago, being then about twenty years old, and his health and appearance, though he had constant work, had been since very much improved: the Salt, he added, had made him eat his food and work better. A farmer, who was present, observed that he usually gave his horses a little Salt in their grains, and found that it did them good; and also that he gave it them as a cure for the bots."—Sir Thomas Bernard's *Case of the Salt Duties.*

55. "Every species of live stock is very much injured by being denied the due supply of Salt. Salt forms an essential ingredient in the food of every species of domestic animals. We feel how requisite Salt is to the health and comfort of the human species: it is equally so to that of cattle. Salt softens the skin of the domesticated kinds, and makes their hair and wool fine and shining. When horses are fed on bruised gorze, or any kind of fruit abounding with Salt, or when a handful of Salt is put into their food every day, their pile becomes soft and shining. The superior quality of wool in Spanish sheep proceeds chiefly from an abundant supply of Salt. When Salt is given to cows, it improves the quality, and increases the quantity of their milk. It is necessary to cows: they are so fond of it that they eat wet litter from under horses, or on the dunghill, because it is impregnated with Salt, the Salt of urine. It is a great pity that animals so very valuable, and whose produce depends on their being properly fed, should be obliged to eat litter mixed with dung to obtain a Salt with which they ought to be amply supplied. The duty on Salt is of all others the most improper."—From William Alton, Esq. *Communicated to the Chester Chronicle by the Rev. B. Dacre, of Mosely, near Manchester.*

56. "The mortality has increased in our fields since the augmentation of the price of Salt has obliged the farmers to give it more sparingly to their cattle. 'In the district of Champsaur, and the adjacent countries, we are accustomed to give every ox and cow four ounces of Salt every eight days, and about an ounce to every sheep and goat at the same intervals. When this practice is neglected the animals eat less; they lose their spirits, their hair rises, they go licking in their stalls the bottom of the walls where the salt-petre is formed, they grow lean, become barren, and disease ensues."—From the *History of the Royal Society of Medicine at Paris, for the years* 1777 *and* 1778.

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57. "It is well known that hay, mouldy from rain, is rendered palatable and remarkably nutritious to cattle, by simply strewing Salt on the stack, at the rate of ten or fifteen pounds per ton when making. Equally notorious is it, that a sensible effect is hereby produced to the taste; that cattle will prefer it to better hay well put together, and will demand, when fed on it, without injury to themselves, three times as much water; which circumstance alone accounts for that aptitude to fatten which is conspicuous in cattle fed upon hay so salted. It remains to be proved, how good hay, which had not spent its strength in premature fermentation, would bear such a quantity of Salt as would invigorate the stomach, quicken the circulation of the blood, and excite in cattle a desire to drink largely; that it does bear it, and that the effect this hay has upon stock, almost surpasses belief, we have ascertained. Some of our hay lately in use was of the first quality of sheep-hay, the produce of rich and deep loam on a limestone bottom; it was put together without wet, and had twenty-five pounds of Salt per ton sprinkled through a sieve, a greater quantity than has yet been used. In colour, flavour, and proof, it equalled any hay whatever; and satisfies us that this or a greater quantity of Salt may be infused into hay of the best quality, and with the best possible effect. In confirmation of these facts, we have also the authority of Mr. Darke, of Breedon, one of the most celebrated graziers in the kingdom, who has mixed Salt with his flooded mouldy hay, eight pounds of Salt only to a ton, and declares that his Hereford oxen did better on it than others that had the best hay he had, and that he was, and is convinced, that the hay had all its good effect from the Salt. Salt cannot be conveyed into an animal in a more effectual manner than by sprinkling it on hay through a sieve, when in the act of putting it together; for every particle is imbibed in the fermentation without a possibility of waste. It will upon trial, no doubt, prove a better breakfast than those cold dews which prevail in this country nine months out of the twelve; and which are more prejudicial to the wool and carcase of those feeble animals, than has hitherto been considered." Lord Somerville's *Communications to the Board of Agriculture.*

58. "As the season for hay-making is drawing near, we must beg leave to recommend the salting of ricks. I am persuaded few farmers are aware of the benefit arising from this practice, particularly in stacking in sultry weather. The Salt preserves the hay from over heating and becoming mildewed: it may be put together greener than otherwise, without danger of firing. All kinds of cattle, &c. prefer inferior hay thus managed to the best that can be placed before them that has not been salted: the Salt assimilates with the juices of the hay, and thereby prevents too great a fermentation, and by its soporific quality gives

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it a superior flavour. The proper way of using it is, in building the stack to sprinkle the Salt alternately between each layer of hay, in the proportion of one hundred weight to seven or eight tons."—*Annals of Agriculture*, vol. vi.

59. "In the survey for the county of Lancaster, Mr. Holt says, 'the high duties upon Salt operate as great obstacles to the application of this article to the advantage of cattle, in giving it in troughs, &c. in certain cases. It is an article most cattle are fond of: it assists digestion, promotes a disposition to fatten, prevents certain disorders, and in foreign parts they use it in large quantities, not being loaded by high duties; and, it is asserted, entirely prevents that fatal disease amongst sheep, the rot."

60. "A salt-marsh is not only the best and most healthy place for thriving and fattening all sorts of cattle and horses, but it is likewise the best medicine for any putrid or contagious disorder which they may have contracted. As a proof of this assertion, when the farmer suspects his sheep are in a consumptive state, or his horned cattle or horses have contracted any putrid disorder, they are sent (where it can be done) to pasture on a salt marsh, which is the best remedy for these complaints, and which never fails to work a speedy and perfect cure. In *Spain*, Salt is given to their sheep in the rot as a medicine, and also to those that are sound, by which means the shepherds of that country say that their wool is much improved in fineness. The grass of salted lands would doubtless be attended with these beneficial effects in a superior degree, as it would operate constantly and more effectually upon them."

"And if the salt marshes be found to be so safe and certain a remedy for the disorders of the brute creation, might we not expect equal advantages to accrue to the human species, if our milk, butter, and all our vegetables, were produced from grounds manured with Salt?"

"Nothing could be more disagreeable and prejudicial to the human species, than for them to be deprived of the use of Salt; the prohibition would be insupportable. Why then should we withhold from the beasts of the field a thing which is so agreeable to their palates and conducive to their health?" *Mr. Hollinshead's Hints to Farmers*, page 12.

61. "When grains, ground corn, &c. are given to milk cows, feeding cattle, or horses, there ought to be two ounces of Salt mixed with every feed that is given to them. This has been the practice of a gentleman in the county of Lancaster, for several years, and has been attended with the greatest success; his cows giving a much greater quantity of milk, and at the same time being in much better condition than those which are fed in the ordinary way." *Hollinshead*, page 12—13.

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62. "The following experiment is communicated to us by William Stephenson, esq. banker, of London:

"Upon a small grass field, which for many years after it had been in tillage, produced nothing but a very dark-coloured, dry kind of grass, and neither horses nor neat cattle would thrive upon it, I sowed about sixteen bushels of foul Salt per acre, in April, 1778, and ever since that time it has been perfectly green, both in summer and winter, and cattle of all kinds thrive in it remarkably well." *Hollinshead*, page 18.

63. Extracts from Papers lately published by the Right Honorable Sir John Sinclair, Bart.

Hay. "Lord Somerville is of opinion that Salt cannot be conveyed into an animal in a more effectual manner than by sprinkling the Salt through a sieve, at the rate of twenty-five pounds weight of Salt to a ton of hay, when in the act of putting it together, for every particle is imbibed in the fermentation, without a possibility of waste. This salted hay is of great use to sheep, when put on turnips early in the season, for the tops being then rank and strong, many of the sheep die suddenly from pent-up wind, occasioned by excess of fermentation in the stomach. Salt, or salted hay, are then devoured by them with a greediness which denotes their salutary effect. By the use of salted hay, Lord Somerville did not lose one sheep on turnips in the autumn of 1801, though the season was rainy and unfavourable.

Straw. "The ancients were accustomed to prepare their straw for feeding stock, by keeping it for a considerable time *sprinkled with brine;* it was then dried, rolled up in bundles, and given to oxen instead of hay.*

Horses. "In Flanders, it has been found that a small quantity of pounded salt is very beneficial for horses, when new oats are given to them, if the oats are at all moist; and there can be no doubt that moist food in general might be rendered less injurious by the same means; for instance, when raw potatoes are first given to horses.

"Mr. Birkbeck, in his notes on a Journey in America, recently published, mentions, that the horses he saw in the interior of that country were of an excellent description, *and are in high condition, even when travelling at the rate of forty-five miles per day, on long journies.* They are fed well, getting from four to five gallons of oats per day, besides hay, *with a good handful of Salt about twice a week.*

"Salt given to horses cures the *botts;* and it is said might be given with great advantage to race-horses, and would prevent the necessity of applying those severe purges to which they are at present subjected.

* Dickson's Husbandry of the Ancients, vol. ii. page 408.

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Bullocks. "In the East Indies they give Salt to their bullocks, in general daily, to the amount of two or three ounces mixed with their feed of pulse; a due proportion of Salt they consider to be essential for their health, and almost as necessary as food.

Hogs. "Great quantities of Salt are considered to be injurious to hogs; but, in America, Salt is occasionally given to them, to render them tame, and to prevent their being lost in the woods. Mr. Curwen also mixes some Salt with the steamed potatoes he gives his hogs, and he thinks with benefit.

"It is said that in Ireland, when fattening their hogs, they sprinkle a little Salt with every meal, by means of which they are found to fatten in half the period they would otherwise require."—Observations by John Marshall, Esq. on the Medical as well as Dietetic Properties of Common Salt, in the *London Medical and Physical Journal*, vol. xxxix. fo. 231.

Poultry. "Salt also may advantageously be given to poultry, and may prevent some of those disorders to which they are liable. The avidity with which pigeons consume Salt is well known.

Hay. "In a recent communication from A. Bracebridge, Esq. of Walton-on-Thames, he states, that some years ago, the clergyman of Holmes Chapel, who lived near the Salt-Works, gave a favourite old mare, who was much broken-winded, some spoiled hay *that had been salted* (at that time Salt for agricultural purposes was free of duty). The mare had nothing else to subsist on, but throve on that food so well, that she was fit to be put to work again next spring. This induced Mr. Bracebridge to drench some rotten sheep, night and morning, with strong brine; after which, he did not lose one; they became fat, and the meat was fine and good, as if the animals had never been affected."

64. Extract of a Letter from I. C. Curwen, Esq. to the Editor of the Carlisle Journal.

"I avail myself of this opportunity to say a word or two on the subject of Salt. I rejoice to find the trials of it are numerous. In addition to what I have formerly stated in favour of it, I am now enabled to add, that out of fifty shearling Devons, killed this winter at the Schoose, the whole have been perfectly sound. Previous to the use of Salt, it was rare to find a liver (of a sheep) that was not more or less tainted. The cattle and horses are continued in the free use of Salt. Latterly, at the Schoose, I have given six ounces per day to work-horses—four with steamed potatoes, two with steamed chaff. I fully expect it will operate powerfully in preventing horses greasing. In the course of a few months I shall be able to speak more decidedly on the subject. I find the additional quantity of Salt so far to agree perfectly well with the horses. The general use of Salt

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will not only be found highly beneficial to the agriculturist, but will furnish so large an addition to the amount of the salt tax, as to justify and call for the reduction of the duty in favour of the public at large. About fifty thousand tons is all that pay duty in Great Britain. If Salt were generally applied to the feeding of cattle, the consumption would reach six times that amount, and produce, at five pounds a ton, a sum equivalent to the present oppressive and unequal tax, in which a labourer pays a 26th part of his earnings, whilst the opulent do not pay more than from 500 to 1000th part on this indispensable necessary of life." Copied from *the Farmer's Journal for the 4th of January*, 1819.

65. On a Remedy for the Black Scour in Sheep, extracted from a letter to the Editor of the Farmer's Journal.

Kilton, near Bridgewater, Somerset, Dec. 21, 1818.

Sir,

Salt possessing septic and antiseptic properties, it is obvious that it should be used with caution; indeed, experience (the best test of wisdom) has so instructed me. I have for the last ten years, and more, given Salt to sheep in the following proportions, in all cases of diarrhœa, with the best possible success; two drachms (apothecaries weight) of dry Salt for a lamb of nine months old, and that quantity increased to three and a half drachms for a large and full-grown sheep; and in the same ratio for the intermediate ages. The mode I adopt is to introduce the specified quantity into the mouth of the sheep with a spoon, withdrawing the spoon and closing the mouth. In a few seconds the Salt dissolves in the saliva, and the sheep readily swallows it. I consider water not only inconvenient, but improper, as a superabundance of it was, in my opinion, the original cause of the disease. I have seldom found a repetition of the above dose necessary; but if *one* should not prove effectual, there can be no objection to repeating it, every other day, till the desired effect is produced.

Desirous of communicating, as well as receiving, useful information, I am induced to submit the above observations, under the full impression that they will be found beneficial to those who may be induced to make trial.

Remaining, Sir, truly your's,

CHARLES ADDAMS.

From *the Farmer's Journal, January the 4th.* 1819.

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On the use of Salt to Bees.

66. Copy of part of a letter from Sir John Sinclair to the Right Honorable Charles Arbuthnot, secretary to the Treasury.

Sir,

Every day furnishes some additional evidence of the advantages to be derived from the system adopted by parliament last session regarding the Salt Tax. A curious proof of it has lately come to my knowledge.

It is well known that bees do not thrive in damp seasons. A lady whose bees were perishing owing to wet, was induced to try whether Salt would not be of use to them. She spread some thinly on a dry substance near her hives, and found that it was regularly consumed by them. The result was highly satisfactory; for, when all the bees in her neighbourhood either perished or were unproductive, her's throve, and produced a great quantity of honey. This discovery may render the culture of bees less precarious than hitherto has been the case in this country, and may be of great use to industrious cottagers.

I have the honour to be, &c.

EVIDENCE DELIVERED BEFORE THE HONORABLE THE BOARD OF TRADE, IN APRIL, 1817, EXTRACTED FROM PAPERS RELATING TO THE SALT DUTIES, PRINTED BY ORDER OF THE HOUSE OF COMMONS, DATED THE 4TH OF JUNE, 1817.

67. The Evidence of the Right Honorable Lord Kenyon.

"By the information which I have been able to collect, I am induced to consider Salt, when sparingly applied, as an admirable manure, especially for fallows and arable land; and when mixed up with soil out of the gutters, or refuse dirt, or ashes, to be very valuable also on grass-land. My own experience convinces me that it is very powerful in destroying vegetation if laid on too thick, having put a large quantity of refuse Salt on about one-fourth of an acre of land, which, after two years, remains quite bare. A land-surveyor of high character in my neighbourhood considers that the use of Salt would be likely to be very valuable in destroying the slug, wire-worm, snail, &c. which often destroy even whole crops. He also well remembers that Salt was used largely in the neighbourhood of the higher and lower Wiches in Cheshire, before the duties were raised to their present height."

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68. The Evidence of Sir Thomas Bernard, Baronet.

"The use of foul or refuse Salt for manure is well known in Cheshire, Worcestershire, and the adjoining counties. It contains about a third of pure Salt, the rest being the dirt and ashes thrown under foot in the path-ways about the Salt Works. The farmers paid government for the use of it as a manure a duty of fourpence per bushel, and as much more to the Salt proprietor, as I was told, for the purchase of it at the Salt Works. Bishop Watson states, in his Chemical Essays, that near three thousand tons of this refuse Salt were annually sold at Northwich alone for manure, at eight-pence per bushel, including duty, or one pound six shillings and eight pence a-ton or load; and I am informed there was a constant demand for it at that price; and that in Worcestershire, the late Lord Coventry bought many hundred loads of this manure for his place at Crome Court. In 1785, however, its use was put a stop to by an act, which charged it with the full duty on pure Salt; in consequence of which, several hundred thousand loads of very excellent manure have been thrown into the river, under the inspection of the excise officer, and have been wholly lost to the country. The preference given to this manure for a series of years during which its use was permitted, is a proof of its value. The dirt and ashes mixed with the Salt were not worth carrying far; and it would have answered better for the distant farmer to have paid even four pounds a load for pure Salt, thereby saving two-thirds of the carriage, and to have mixed the pure Salt with double the quantity of dirt and ashes in his dunghill at home."

69. Extracts from the Evidence of John Christian Curwen, Esq. Representative in Parliament for the City of Carlisle.

"The superiority of the Flemish husbandry over our own is in the unrestricted use of Salt, by which means the best pasture and meadow grounds in that country are put under a convertible system; and by the augmentation of green crops the produce of every acre is doubled.

"The free use of Salt would greatly tend to promote the cultivation of green crops.

"Norfolk and Suffolk, the two best cultivated counties in England, have one acre in six under green crops: the average of the rest of England only one acre in seventy. Salt in solution is a highly beneficial steep for the prevention of smut in wheat."

70. Extract from the Evidence of Major John Taubman, the Speaker of the House of Keys, in the Isle of Man.

"He has, he said, used refuse Salt as a manure on meadows with advantage: it was sown thinly by hand—cannot speak to the quantity used: the meadow had been much covered with moss, which the dressing of Salt entirely destroyed."

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71. The Evidence of William Horne, Esq. Merchant of Liverpool.

"In respect to the use of Salt as a manure, I am very much encouraged in my favourable opinion of it by Mr. James Manley, an old inhabitant of Northwich, who says, that before 1785, when the use of foul Salt was permitted, it was applied very largely by farmers in the vicinity of the Salt Works, and that a considerable quantity was sent to London for similar purposes. I have had an opportunity of witnessing its good effects on grass land in the immediate neighbourhood of Liverpool, which to this day retains a verdure superior to the adjacent fields, without the aid of any manure since the application of the foul Salt. Mr. Riding, of Hayton, near Prescot, recollects the application of Salt on rushy land with great success, and the late Mr. Tunstall, of the same parish, a large farmer, drover, and butcher, only desisted from the use of it as a manure and for his cattle when the high duty was imposed."

72. The Evidence of Mr. Kingston.

"In reply to your queries, as an agriculturist, I have no hesitation in saying that Salt, if free of duty, would become one of the most useful and general articles of manure that ever was thought of, if properly prepared, by mixing it with mud of any kind, the cleanings of ditches and ponds, the surface of coarse grounds thrown into heaps to rot, blubber, &c. &c. I am likewise persuaded that if it could be afforded to be sprinkled on the layers of hay when making into the rick, in catching weather, it would prevent its heating or getting mouldy."

"I had once some small oxen tied up to fatten, which did not thrive, owing, as the bailiff said, to the badness of hay, of which they wasted more than they ate, but by sprinkling it with water in which some Salt had been dissolved, they returned to eat it greedily. From this and many circumstances of a similar nature that I have been informed of, by persons of undoubted credibility, I am free to say, that if the food of cattle tied up to fatten was sprinkled with a proper quantity of Salt, they would thrive much faster than by the present mode, and would prevent their being hoven by an excess of food."

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EXTRACTS FROM "MINUTES OF EVIDENCE TAKEN BEFORE THE SELECT COMMITTEE OF THE HOUSE OF COMMONS ON THE SALT LAWS."

No. 73. Monday, April the sixth, 1818.

JOHN CALCRAFT, Esq. in the Chair.

John Ayrton Paris, M. D. called in and examined.

You are one of the Censors of the College of Physicians in London, residing in Dover Street?—Yes, I am.

Have you ever resided in Cornwall?—I have during five years.

Do you know any thing of Salt being used as a manure in Cornwall?—The refuse Salt is purchased by the farmers for that purpose, and there is generally a scramble for it, it is considered so desirable to attain it. The effect of it is certainly very striking: it seems to answer best, as far as my enquiries go, to green crops; for instance, to clover and turnips. To wheat and barley it produces a good effect; but it answers better when applied in compost with other manure. I would beg to state one other circumstance in addition, that where wheat or barley has followed turnips, the land of which has been salted, the crop following has escaped the mildew, which has affected land immediately adjoining on which Salt had not been used.

May not the beneficial influence of this Salt depend upon the animal matter which is mixed with it?—Certainly not, for farmers find that that Salt is to be preferred which has been used but once, and they give a superior price for it. That which has been used two or three times, and consequently contains much more animal matter, is considered as inferior.

Do you know the comparative strength of pure and foul Salt?—I can merely give a rough conjecture: it varies considerably in different parcels. I should think, speaking generally, it would be more than half impurity.

Have you formed any opinion as to the effect of a material reduction of the duties on Salt?—It is my opinion, that a very much greater quantity of Salt would be used for manure generally, if the duties and restrictions were taken off. I think there is a feeling among many of the more intelligent farmers of the utility of Salt for a manure, and it is shewn by the readiness with which it is purchased.

You have stated that in some cases it was necessary to mix refuse Salt with compost to make it effectual?—Yes, it appears to be the case that it answers better to wheat and barley when so applied; that it is more successful in fertilizing than when sown with seed.

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Does not that lead you to believe it may be essential that it should be mixed with some other material?—The only conclusion that can be drawn is that which is necessarily drawn from experience: we cannot reason in the present state of our knowledge, with respect to the application of Salt, except by facts, and the facts I have stated are, that to green crops it answers better when sown, and to other crops when in compost.

You say when sown: is the refuse Salt then thrown into the ground with the seed?—Yes.

In the quantity stated?—Yes.

Have you seen it used in those proportions?—Yes.

It gives you about thirty bushels of clear Salt?—Supposing my data to be accurate, it does.

Have you seen it used to a great extent?—No; I have seen enough to satisfy me that it may be used very beneficially.

Have you seen it used to such an extent as to justify any general conclusion?—My impression about it is, that it is extremely useful as an article of manure in Cornwall.

What is the sort of soil; is it strong or light?—I feel a difficulty in defining the soil: it was a clayey soil where I saw the turnips growing; and in a neighbouring field which was not salted, and where turnips were growing, the crop was good for nothing.

You stated the price to be tenpence per bushel?—Last year: I believe it is sometimes a shilling.

The value of sixty bushels, therefore, would be nearly sixty shillings. Is there any manure you could apply to ground that would be so cheap at that price?—I am not farmer enough to answer the question.

If the effects are so obvious as you state them to be, can you give any reason for it not being much more generally used than it is in Cornwall?—The difficulty of obtaining it is so great.

Do you mean to say that all the refuse Salt that is to be had is so used?—I believe it is.

You are not aware whether any applications have been made from Cornwall for the Rock Salt for manure?—I am not acquainted with that.

You stated you had observed the effect for a considerable number of years, can you state what number?—No; but it is the tradition of the people, that Salt was spilled between Penzance and St. Ives many years ago, and the spot is marked by an increased luxuriance in the herbage which is now visible.

Tuesday, 7th day of April, 1818.

74. *John Christian Curwen*, Esq. a Member of the Committee, examined.

Have you any information to give to the committee, relative to the operation of the Salt Duties on the agricultural interest of

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the country?—I hold in my hand an affidavit that has been made by a person who has the charge of the cattle, and the conduct of an experiment that has been carrying on since November last, in feeding with the addition of Salt. The affidavit was made in consequence of an application by Sir Thomas Bernard. I requested that he would make the application for it, that it might not be said that any influence had been used on my part; he did so, and an application was made to a Mr. Thompson, an attorney at Workington, the secretary to the Agricultural Society there; in consequence of which the feeder was examined before Mr. Thompson as to the effects of the experiments; and I have in my hand his affidavit, taken before a magistrate.

[It was delivered in, and read as follows.]

"William Glover, of the Schoose Farm, in the parish of Workington, in the county of Cumberland, the feeder and superintendent of the cattle of John Christian Curwen, Esq. at the said farm, maketh oath and saith, that this deponent began to give Salt to the cattle under his care the nineteenth day of November last past; and from that time till now the said cattle have had Salt as follows: forty milch-cows and breeding heifers have had each four ounces per day; fourteen oxen for fat, and sixteen oxen for work, each four ounces; twenty-seven young cattle, seven of them two years old, the rest one year old, have had each two ounces per day; twenty-six young calves, each one ounce; two bulls had also Salt administered to them; and forty-eight horses kept at the farm have had each four ounces per day; four hundred and forty-four sheep had four stone, or two ounces each per week given at twice, and on slates. The advantage of Salt for sheep appears to this deponent to be great, as he says none of the stock have died in the sickness since they commenced giving Salt, and they have had none in the rot; in other years they lost some of their ewes and wethers in the sickness. The cattle, both old and young stock, have their Salt given in steamed chaff twice a-day, which makes them eat it up, as well as other inferior food. The horses have their Salt given them amongst their steamed potatoes twice a-day, which makes them clean out their cribs, and is a benefit to their health and condition; that the cattle have been in the highest health ever since they commenced the use of Salt. And this deponent saith that he has now kept the cattle at the Schoose Farm for ten years, and they never were so long without sickness; they were formerly subject to obstructions and inflammations; and that he has not had occasion to use any medicine since the twenty-ninth of November last, except in one instance of a cow (now quite well), and he can shew the whole of the said stock, one hundred and twenty-five head of cattle, without the exception of any one animal that is out of order. And he believes there is nothing

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that will promote the health of cattle and their good condition more than Salt, when rightly administered; and that medicine would, in his opinion, be little required, if he had Salt at command. And this deponent saith, that the fourteen oxen abovementioned for fat were fed on straw, steamed chaff, and turnips only; and eight of them were weighed on the thirteenth day of February last, and seventeenth day of this month of March, and the increased weight of the eight was thirty stones, of fourteen pounds to the stone.

WILLIAM GLOVER."

Sworn the twenty-fifth day of March, one thousand eight hundred and eighteen, before me,

RICHARD WATTS,
One of his Majesty's Justices of the Peace in and for the county of Cumberland.

"I have also another paper which I wish to put in; it is a statement of about thirty persons, farmers, who have signed the paper which I hold in my hand, who declare they would use Salt if they could procure it.

[It was read as follows.]

"We the undersigned, being farmers and owners of land in the neighbourhood of Workington, do hereby certify, that we are acquainted with and witnesses to the fact of Mr. Curwen giving Salt to his cattle and horses with their food, at the Schoose Farm and at Workington; and that we are desirous of using the same for our live stock, if it could be obtained without difficulty, and at a cheap rate. Witness our hands, the 24th of March, 1818.

William Salkeld,	John Birkett,
John Pearson,	Alderce Miller,
Henry Stalker,	Matthew Sproutt,
Robert Pitts,	William Fisher,
William Simon,	Thomas Miller,
John Rook,	Joseph Simon,
William Rogers,	John Thomlinson,
John Wilson,	John Sanderson,
Ostle Mardaunt,	Francis Porter,
William Dixen,	Thomas Sparks,
George Baines,	Cuthbert Wilson,
William Haig,	John Greener,
Isaac Simon,	Robert Bell,
James Graham,	Joseph Crosby,
Thomas Barnes,	Joseph Messenger,
John Hetherington,	James Case.

"I would wish to state, that in consequence of a clause introduced in the fish-bill of last year, I made an application to

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the collectors of the Salt-duties at Northwich, for liberty to import five tons of Rock Salt. From that period the Salt has been administered with great advantage to my cattle, sheep, and horses; their condition is greatly improved, and their health has been invariably good, and which I attribute greatly to the use of Salt given with steamed chaff; that is, the husk of the corn, which was of little or no value prior to its being given, dissolved in the quantity of four ounces, in about two stone of that steam-chaff per day to the cattle; this, of course, makes a considerable saving in the quantity of green food which would otherwise be required. Having been a considerable corn-farmer, I have a sufficiency of wheat and oat chaff for the supply, which is about two stones each per day; it is prepared by the application of steam; for food of this kind is of so little value, that cattle would hardly be induced to take it without oil-cake, or ground grain; but by the application of Salt, it is taken exceedingly well, with very little loss: the first visible effect of the Salt was in its freeing the milk from all taste of the turnip. I am in the practice of selling a large quantity of milk to the town of Workington, and heretofore complaints were often made of the milk tasting of turnips; but since the giving of Salt, there has not been a single instance of complaint. As this was a result I had not looked for, I was disposed a little to question whether it was not owing to the better state of the turnips, and better care. I was aware that saltpetre, when dissolved in milk, evaporates the taste of the turnip; but on stating some doubt upon this matter, I learnt a fact from my horse-drivers, with which I was not at that time acquainted, which was, that the dung of the horses fed with steamed potatoes was highly offensive; but from the period of giving them Salt, the odour of the dung was totally destroyed, and became perfectly sweet; all the obnoxious smell was quite done away; and uniting both these circumstances together, confirmed me in the opinion that it was the Salt which had produced the effect upon the milk. The advance in fattening of stock has certainly been very considerable; but it must appear evident, that without experiments accurately made, and for a length of time, it would be utterly impossible to say what may be the comparative advantage derived from it; for at the last return of thirty-five days, the gain per day of animals fed on the same food varies from six ounces to two pounds six ounces per day, in animals of from one hundred to one hundred and fifty stone; therefore it will be seen, that to make an experiment with any degree of accuracy, much care must be taken in selecting animals whose propensity to fatten is equal: but I conceive I am justified in considering that the free use of Salt would be an immense advantage to the farmers; in stating of which, I dare say there are few gentlemen I shall not surprise. In stating what I conceive to be the advantage, to many it might appear an exaggerated statement, though I am much below, rather than

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above the benefit which would generally result from the free use of Salt. In Great Britain there are thirty millions of sheep: the loss upon these, at the most moderate computation, may be taken at two per cent. or six hundred thousand :* taking them at five shillings a-piece, that would amount to a hundred and fifty thousand pounds. Now, my opinion is, that for insurance of health, the advantage of fattening, and for the benefit to the wool, I shall be found to under-rate, when I state the advantage would be sixpence per head upon the whole thirty millions, beyond the cost of the Salt, or a saving of seven hundred and fifty thousand pounds per annum.

"There are supposed to be four millions five hundred and twenty-one thousand beasts of various descriptions in Great Britain. I would suppose the advantage in being able, with the addition of Salt, to feed with inferior food, health, and fattening, would produce a saving to the farmer, taking it only at seven shillings a head, of one million five hundred and eighty-two thousand three hundred and fifty pounds annually.

"There are supposed to be one million five hundred thousand horses of all descriptions, which, in point of health and feeding with inferior food, I calculate a saving equal to ten shillings a head, which amounts to seven hundred and fifty thousand pounds annually. I would also state, that in an examination formerly before the Board of Trade, I have given a statement which was then mere matter of opinion. I then supposed the quantity of Salt that might be given to sheep to be equal to two stone of fourteen pounds each, per annum; in this I certainly was mistaken, because what I have given is, I believe, more than double what was given by Lord Somerville, and amounts to about nine pounds per annum each. In regard to cattle I have under estimated the quantity, because if Salt could be had at a moderate price there is no animal I would give less than six stone to per annum. I by no means state that the quantities I am giving are precisely what might be given; I think it probable that much greater quantities might be given with advantage; but in an infant experiment like this, I considered any failure might have been attended with bad consequences. I was therefore anxious to give even less than I might probably have done with benefit after the experiment, and which I shall in a short time be induced to try. The fondness of animals for Salt is very remarkable: I have been in the habit almost daily of feeding the young stock with a mixture among bran, and it brought them to be so familiar, that many of them, which before would

* This calculation is upon the supposition that on an average two sheep in every hundred sheep throughout the kingdom now die of the rot, amounting in the whole to six hundred thousand, and that this immense loss would be entirely prevented by Salt; as it has been found that this disease never attacks those sheep which have free access to Salt, or that have Salt regularly administered to them.

S. P.

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not suffer even the feeder, except very early in the morning, to touch them, became so familiar, that I could handle them in any way whatever. In the last year I was induced to make an experiment with Salt, by mixing a quantity with earth, and taking a number of grubs and putting them amongst the soil: I found it proved destructive to them all. In the present year I have directed a pound of Salt to be mixed with every Winchester bushel of oats, about six pounds to an acre, and I have sown it upon such ground as I thought likely to be troubled with the grub, in the hopes that it may be the means of preventing their destroying the crop, and the destruction which of late years has taken place in various parts of Cumberland from the grub."

Eighth day of April, 1818.

75. *Arthur Young*, Esq. called in, and examined.

You are secretary to the Board of Agriculture?—I am.

Did you ever try Salt in the feeding of your cattle?—Yes, but chiefly with sheep, and I found the sheep astonishingly fond of it. I found them so fond of it by some small trials, that I had troughs ten feet long, nine or ten inches wide, and three or four inches deep, in which I scattered Salt for them, and feeding them with my own hand I found them so ravenously fond of it, that the moment they saw me at the gate of the field they gallopped up from every part, and surrounded the troughs so eagerly, that I was forced to place a pole about eighteen inches or two feet long over the troughs to keep them from jumping in, but all their heads were in the trough in a moment.

Can you state what was the quantity you gave?—I cannot with accuracy; but the quantity they took was a perfect contrast apparently to the extreme eagerness with which they came; they took a good lick at it, and went away; but they were excessively eager to come and get that lick: some would take more than others.

Can you state precisely what was the quantity you might give?—No, I cannot.

Do you consider that it would be beneficial in preventing the rot in sheep?—I found it so, in the years when my neighbours' sheep were generally affected with the rot, my sheep escaped; and my land was quite as wet as my neighbours'.

By the returns to the Board of Agriculture, the number of sheep in Great Britain appear to be estimated at thirty millions; the Committee would ask you, whether you conceive the advantage of sixpence a-head for the free use of Salt would be stating it too largely in favour of the Agriculture of the country?—If any person, at the time I was in the habit of giving my sheep Salt, had offered me a shilling a-head to let it alone, I should have rejected it at the very first blush.

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Would you think, considering the advantages in health, fattening, and the power of using inferior food in the feeding cattle and stock in general, that the free use of Salt would be an advantage equivalent to seven shillings a head to the farmer?—I should think it would be worth a great deal more. I think it is INVALUABLE; in short, let my answer be what it would, I am confident I should be under the mark.

You consider seven shillings a-head very much under the mark?—I should suppose seven shillings a-head for cattle is much under the mark.

Do you think ten shillings a-head upon horses, for the advantage of health and the use of inferior food, would be estimating the free use of Salt too high to Agriculturists?—I have so little experience myself in giving it to horses, that it must be nothing but a matter of opinion; but I should have no hesitation in giving it as my opinion that it is certainly worth that and more too.

If upon thirty millions of sheep the advantage at sixpence per head to the farming interest of the country makes an aggregate of seven hundred and fifty thousand pounds, and seven shillings upon four millions five hundred and twenty thousand, stated to be the quantity of beasts in the kingdom, making one million five hundred and eighty-two thousand three hundred and fifty pounds, and ten shillings upon one million five hundred thousand horses, making seven hundred and fifty thousand pounds, the total of which amounts to three millions and eighty-two thousand three hundred and fifty pounds, in estimating that advantage to accrue from the free use of Salt, is it overstated?—I do not think it is overstated.

You have said your sheep took a lick or two, and then left the Salt?—Yes.*

Did they consume all you had given them?—It was all gone very soon.

There was none left?—Not an atom.

76. *John Christian Curwen*, Esq. M. P. further examined.

Are the statements of the affidavits given in by you yesterday confirmed by any inspection of your own, or do you rest entirely as to the Salt given, or the effect produced, on the reports of your bailiff or manager?—They certainly are confirmed by my own observations up to the twenty-first of January, which induces me to believe them to be perfectly correct with regard to the quantity; I can only state it according to my directions, and I have no doubt of their being exactly complied with.

* I have myself seen similar instances. The circumstance is owing to the refined salt being too sharp for the mouth. It is therefore always better at first to dissolve the salt in water and sprinkle the food with it. The quantity might afterwards be gradually increased; and by this management, sheep, horses, and cattle, may be all brought to swallow salt with greediness.—S. P.

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Your personal inspection goes only through a month?—For two months I can speak of my own knowledge; and I can state that the affidavit is in perfect conformity with the weekly return made to me.

The first statement is with respect to milch cows: the affidavit states, that one effect produced, was taking away the taste of the turnip in the milk; what other effects have you observed?—I observed that the condition of the cattle was greatly improved; that they were in a state of perfect health during the whole of the period to which I can personally speak, and that those complaints that upon so large a stock were usual in other years did not occur; and that the inferior food, such as the steamed chaff, was infinitely better eaten by the addition of Salt in the last year, than it had ever been at any former period whatever when it was given without; and it now comes to my recollection, that though the milch cows would always take the chaff, the oxen would not till it was mixed with Salt or some other ingredient.

In what degree does the use of Salt enable you to feed with kinds of food which would not have been useful without the mixture of Salt?—The weight of chaff given to each milch cow and ox is about two stone a-day. I consider it to be of no more value than the mere cost of preparing it, and that it does materially lessen the consumption of green food; admitting, that by the use of Salt the cattle were induced to take two stone instead of one, that would make a difference of two stone of turnips a-day.

What will be the value of the chaff, unmixed with the Salt, in the feeding of cattle?—It has seldom ever been made use of whatever.

What quantity of Salt do you mix with it to make it palateable?—Four ounces have been given; and I am by no means satisfied that a larger quantity of Salt might not be given with advantage: I am of opinion it might.

What proportion would you consider the chaff, when mixed with Salt and rendered palatable, would bear in its nutritious quality to any other food on which they had been accustomed to be fed?—I conceive that chaff has some nutrition, because in steaming one easily perceives that kind of odour from it which argues that it is of some value: but undoubtedly it cannot be of very great value: the Salt operates upon the digestion of the animal, and in promoting its health.

You consider it to be as valuable as any other food you are accustomed to give the animal, in proportion to its quantity?—Undoubtedly not; it cannot be supposed that if the whole consisted of this food it would produce the effect; but it is highly valuable on this account, that with the quantity of turnips given, which is about eight stone, with two stone of steamed chaff and one stone of straw, milch cows are kept in the highest possible condition: the operation of this warm food upon the bowels of

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the animal will prevent that great quantity of turnips having the effect it would otherwise have; it keeps the bowels and stomach in perfect good order: for it is found from the state of the dung of cows, when it is too solid or too much otherwise, the animal is never in a good milking state.

You state, that with the admixture of four ounces of Salt per day, two stone of chaff, which would not be otherwise useful, is rendered useful, and the rest of the food is rendered wholesome? —I consider the value of the Salt great in itself, but greater still when mixed; inasmuch as it puts it in the power of the farmer to make use of one-eleventh part of the whole food given in the feeding of the stock that would otherwise be of no use whatever.

By what rule were you governed in the quantity of Salt you gave to your own cows?—It was from the quantity we had been in the habit of giving to cattle out of order as a medicine, and therefore I adopted that proportion as what I thought might probably be the appropriate quantity; but I by no means wish it to be understood that there may not be great improvements by increasing the quantity.

Is it not a much greater quantity than that stated by Lord Somerville, or in any other previous experiment?—I am not aware that my Lord Somerville ever gave it to cattle, nor had I the benefit of the experience of any preceding agriculturist that had made use of it: recently I had an opportunity of conversing with General Boyd, who served during the last war in the American army, and from him I learnt that in America they were in the habit of giving Salt with great advantage to their horses.

Do you mean the horses in the King's troops?—The horses in general. He stated that it frequently happened, in that warm climate, that the horses have been over-driven, and are extremely sick; that by taking a handfull of Salt and rubbing over their mouths, they would, in a quarter of an hour or twenty minutes, recover themselves, and take to their food again. In giving Salt to horses, one very valuable result has been found, that in feeding with steamed potatoes and cut straw, frequent accidents, by overloading the stomach, have occurred, with symptoms which have very much the appearance of paralysis, as the animal was found to lose the use of his limbs: but subsequent experience has taught us that it proceeded from the animal being over-gorged, and the powers of digestion being lost; and it has often happened that horses have been lost by giving them too much food; but since Salt has been given, (from the twenty-first of November last up to this time), no instance has occurred in which there has been the least inconvenience arising from feeding with steamed potatoes.

You conceive that those complaints of the horses are perfectly remedied by the application of a certain quantity of Salt in their food?—Yes.

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And that quantity being four ounces?—Yes; and I am led to believe that in soiling, particularly in giving clover and tares, the cattle are very subject to blowing. I am strongly disposed to believe, from the effects I have seen, by giving them Salt with their potatoes, the same benefit would be found to result from giving them Salt to lick with their green food; that they would not be subject, as they have been, to blowing or being hoven, which perhaps is one of the greatest drawbacks upon one of the most beneficial practices in agriculture, which is that of soiling cattle.

Do you believe that Salt, as applied to the food of cattle, is nutritious in itself, or that it only contributes to render the food given to them more so, and therefore makes it go further?—I should apprehend that its benefit arises from promoting digestion and keeping the animal in a state of health. I hold in my hand a paper containing a statement of the last thirty-five days of the progress of a certain number of cattle, with their ages and their weights, fed upon turnips, steamed chaff and straw, and four ounces of Salt per day.

It was read as follows:

Weight of feeding oxen at the Schoose Farm, February the twenty-first to March the seventeenth.

Hereford.			Gained per day from the 11th of February till the 17th of March.
Stroller, nine years old.	126	127	1 st. 6 oz.
Punch, nine do.	121	122	1 st. 6 oz.
Pink, nine do.	132	138	6 st. 2 lbs. 6 oz.
Rose, nine do.	153	156	3 st. 1 lb. 6 oz.
Brown, nine do.	111	115	4st. 1 lb. 6 oz.
Prince, nine do.	139	144	5 st, 2 lbs.
Short horn, reared in the house.			
Simon, 2½ years	111	116	5 st 2 lbs.
Magog, 2 years 2 months	110	114	4 st. 1 lb. 10 oz.

Will you state whether a beast eats the same quantity of food with the Salt as he did without, or more or less?—I should have no doubt on the average he would eat more, because I conceive the operation of the Salt is to keep him in better health; and as his stomach is always good, he would eat more, and make a more rapid progress in fattening.

Of the same kinds of food or inferior food?—I have stated an ox would take with Salt a certain portion of inferior food along with a sufficient quantity of nutrition; for I have long been of opinion, that if in the weight that is required to carry [illegible]nomy of nature, cattle could be induced to take it,

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that use might be made of a certain proportion of inferior food; and out of this is to arise one of the great advantages in the use of Salt.

Have you any means of estimating the difference in the value of the food that might be applied to fattening the animal with Salt, and without?—I should state, that I conceive that giving an additional stone of chaff might save three stone of turnips.

Have you any means of judging whether the use of Salt would bring young cattle forward to pasture, so as to enable them to be fattened and killed earlier than they would otherwise be?—I should think it would. I should think, whatever promotes the general health of the animal, must accelerate its progress. I may also state, that Salt to the amount of two ounces a-day has been mixed with the new milk and given to calves; with which stock, as we have been remarkably fortunate in the present year, we are inclined to suppose it has had a very beneficial effect.

The use of Salt given to milch cows and cattle is of very old date?—I do not know of any in England, and it certainly does seem a very extraordinary thing, that whilst we know that Salt to a very large amount, and at considerable cost, has been exported to the Netherlands and other parts of Germany, for the use of their cattle, no use of it has been made at home. It is one amongst the many pernicious consequences of the Salt duties that they have prevented the English farmer making use of that which is attended with such beneficial consequences in other countries.

Of what description of sheep does your flock consist?—South Down.

Of what number?—I think the number returned at present is four hundred and forty-four.

Upon what sort of ground is it usually fed?—Upon a strong clay: as unappropriated for sheep as any land in the kingdom.

Have you always been in the habit of feeding upon that sort of ground?—Yes.

Have they succeeded upon that ground generally?—I used to have a great number of losses before I used Salt.

Have you read the astonishing effects ascribed to Salt in France, as stated in some passages in Mr. Parkes's book?*—I have.

Do you believe, or have you found that the same ground with Salt will support double the number of sheep that it would without it?—I have not had experience enough to give an opinion upon it.

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* This refers to the testimony of Dr. Anderson, which I quoted in a former publication of mine, entitled "Thoughts on the Laws relating to Salt," &c. S. P.

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The committee apprehend, that with respect to sheep, as well as with other animals, the quantities that have been stated by you are matter of experiment, and that nothing particular is to be concluded from them, except that Salt is acceptable to animals, and beneficial to them?—I certainly consider four ounces a-day for stock to be what may be relied upon throughout the year: but with regard to sheep, the difference of their food being so considerable from that of cattle, I do not feel so competent to speak so decidedly.

You have stated yourself previously to the last year to have been in the habit of using Salt as a medicine, and from your experience of its salutary effects, you consider the free use of it as a condiment would be the greatest boon government could bestow. It is stated also, by Mr. Horne, that Mr. Curwen assured him he would give Salt in great quantities to his cattle if it were duty free?—The opinion that I had then formed from theory is considerably strengthened. I may safely say, I entertain not the least doubt that I have understated all the advantages resulting from the use of Salt. I was led to form my opinion upon what I understood to be the practice of every farmer in the Netherlands.

What is the value of hay when flooded and mouldy, which cattle will refuse?—I believe it is of no value but for the dunghill.

What is the value of good palatable hay per ton, for the use of cattle?—I should think from three to four pounds per ton.

What is the quantity of Salt that would be applied to sweeten mouldy hay?—I am unable to say, because I never had Salt in my possession till last November; therefore I cannot say what quantity should be used.

Do you not think if ten or twelve pounds of Salt, under the high duties, could convert mouldy and flooded hay into nutritious and palatable hay, that it would be a considerable gain to the farmer who used it?—There can be no doubt of it.

In your evidence of last year you referred to the Flemish husbandry, and that by the free use of Salt, the produce of an acre is doubled: will you state how the Salt is applied?—The Flemish husbandry consists in converting the whole of their soil to either corn or green crops; they have therefore little or no meadow or pasture; the consequence of which is, that the product of an acre of green food is generally, in point of feeding (as they do in the soiling system) rendered capable of producing more than double the quantity of either milk or fat, than could be produced by the best grazing acre in this kingdom; and that to bring it into general use, and to avoid the difficulties that arise from blowing or hoving, I consider Salt would be of the most material benefit, because, with all the care and attention that can be paid to feeding stock, the accidents from hoving fre-

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quently occur, and that those under unskilful hands very frequently prove fatal.

If the committee understand you, the advantage arises from soiling. and not from applying Salt to the land?*—Undoubtedly from soiling: but I consider Salt would most materially contribute to the general introduction of soiling. In the county of Cumberland, within the last seven years, there is scarce a farmer that has not been more or less in the habit of soiling his cattle during a part of the day: in many instances it is continued throughout the whole of the day; but the objection to it generally is the liability of hoving,† which is a very great impediment to its general introduction.

Are the committee to understand that by this system, by the use of Salt one acre will support two beasts that would support only one before?—Yes. I consider, from the experiments that have been made at Schoose Farm, that a hundred stone of green food will produce one stone of animal food to the butcher.

Have you made any experiments in the solution of Salt for steeping corn in, to prevent the smut?—It has very long been the invariable practice in the north of England to use a quantity of Salt, or sea-water, in the steeping of corn: it is a very old practice, and is supposed to be the best mode by which the grain can be secured against the smut.

What is the quantity necessary for steeping a certain quantity of corn?—I do not exactly know the quantities.

Is the value of wheat very much impaired by the smut?—Yes.

In what proportion?—I should think smutted wheat in years when the best wheat is worth ten shillings a bushel, smutted wheat would not be worth one-half.

Has this been found to be an essential security against it?—I believe in a great measure it has. I own I was myself a little incredulous upon this subject, as I could not perfectly comprehend how it acted. I was disposed to call in question the using of Salt in steeping; and, acting upon my own opinion, I sowed

* Lest this term should not be understood by every reader, it may be worth while to observe, that *soiling* is descriptive of the practice of cutting green food daily, and giving it to cattle in their stalls, or putting it in their racks, instead of allowing them to collect it for themselves in the fields. By this treatment, the animals will eat many plants with great relish, which they would not touch while growing upon the land; and the quantity of manure which any farm would produce under the usual management is much increased by this method of feeding.—S. P.

† The term *hoving*, or *hoven*, is made use of by graziers to describe a violent distention of the stomach of an animal, from the extrication of gas in the decomposition of green food, when eaten too greedily, or in too large quantity. The extrication of this air from the food occasions some contraction in the upper part of the stomach, which prevents the gas from passing off by the throat; so that if the animal is not relieved by artificial means, it generally dies in agony. It was usual formerly to relieve a beast under this suffering by making an opening in the side with a knife; but flexible tubes, to thrust down the gullet, and which are sold in London and elsewhere for the purpose, are now I believe generally employed in such accidents.—S. P.

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my wheat without steeping it, and I was certainly very early convinced I had better have followed the ancient practice than have deviated from it.

You have stated, that the advantage to your farm (of eight hundred acres, at one thousand pounds a-year) you should estimate at three hundred pounds per year; upon what grounds is this calculation made?—The calculation was made upon the supposed advantage to a stock of one hundred and twenty head of cattle, eighty horses, and five hundred sheep, with the benefit that would accrue in feeding of them, by giving them a portion of inferior food, which, without Salt, oil-cake, or some sort of meal, they would not be induced to take; also, in the increased fattening and milk of the stock. Supposing Salt to be forty shillings a ton, being in the habit of consuming ten tons, or sometimes more of oil-cake, the cost of which might be taken at average years at ten pounds a ton, there would in that article alone be a saving of eighty pounds; that whatever portion of Salt was used, the value of the manure would be most considerably augmented, as no particle of this Salt, or at least a very small portion of it, would be lost; by proper care, therefore, the ground would in another shape have the full advantage of all the Salt that had been used in feeding. In order to secure this advantage, I might state, that the urine is conveyed into pits, which, by forcing pumps, is thrown over the midding:* from this I should calculate a very great advantage to accrue; and I do not think, as matter of opinion, that the calculation I was led in a former year to offer of an advantage of three hundred pounds on a farm of eight hundred acres, or one thousand pounds a-year, was overstated.

The augmented value of the manure must be in proportion to the value of Salt as a manure?—To be sure. I entertain no doubt it will be found of great value as manure. I have heard there have been experiments tried at Lisle, by applying urine entirely alone, and the effect is astonishing.

Are you not aware that there is a great deal contained in urine besides the saline particles?—Yes.

From whence do you derive your knowledge of the Flemish husbandry?—From acquaintance with the country, from travelling through it, and residing there.

You mentioned in your evidence yesterday an application you had made to Northwich for Salt: will you state how long that was after the passing of the bill?—I wished to have it as early as possible. The bill passed in July; and I think my applica-

* To those farmers who reside upon the sea-coast, the practice of throwing sea-water upon their composts and dung-hills, and occasionally upon their fields, may be recommended with great prospect of advantage.—S. P.

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tion was in September. The salt is given to cattle dissolved in their steamed food: to horses it is given bruised in their corn; and to pigs it is given dissolved in their wash.

April 13th, 1818.

77. *John Christian Curwen, Esq.*

Delivered in some papers, containing information to be laid before the committee.

St. Helens, April 10th, 1818.

Dear Sir,

According to your desire, I went over to the Schoose Farm last Friday to view your stock, and to make a report of the supposed advantages to be derived from giving animals fed on green food a proportion of Salt along with it. Having had an opportunity of viewing your stock about this time last year, and also during the summer and autumn prior to your beginning this plan, I am enabled to point out, in a great measure, the advantages to be derived from it; for certainly every animal, according to its respective age, is much better in condition than at this period of the spring last year; and to my knowledge the stock were fed precisely in the same way, except that of giving them the proportion of Salt; and, according to William Glover's statement, they have been much less subject to disorders. From the experience I myself have had, for twenty-six years past, in the greatest and highest bred stocks of short horns in the counties of Northumberland and Durham, I can safely say I never saw so many in such high condition as they are; from the oldest cows and oxen taken off work, to yearlings and calves, they are all in the most thriving state, and fit for the shambles. I very much regret that some have not been fed without the Salt, as the advantages would have appeared more plainly from the contrast: but it is not yet too late, as one or two of the yearlings and old cows may have their Salt taken from them, which, by your return home, would shew the difference. My own sentiments, with regard to Salt, are, that in itself it does not possess any fattening qualities; but as a means of creating appetite, and assisting the digestion, it may be employed to very great advantage, and more particularly where green food is given to cattle in summer, or a large portion of turnips in winter; but a little more experience is required before I can decidedly speak as to its advantages, though, so far as the experiment has gone, it appears very striking, and the use of it ought to be encouraged: the benefit to sheep has long been known and admitted; and reasoning from analogy, there can be little doubt of its advantage to large cattle also: but so long as the difficulty with regard to bonds, &c. in procuring, and the jealousies of the excise of its being properly applied, exist, no person who values his own quiet will enter into

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the bonds necessary for that purpose, or wish to have it in his possession, if there is a power left in any petty exciseman to harass and vex him about it; so that, however advantageous the use may be, the present bar must be entirely done away with, before it can be brought into general use and benefit to agriculture.

I remain, dear Sir,
Your most obedient humble Servant,
J. C. Curwen, Esq. ROBERT THOMPSON.

"I, Samuel Woolf, of Haslingdon, in the county of Chester, farmer, do hereby voluntarily make oath, that in the farm in my occupation I make in the months of June and July in each year (being the principal dairy months) cheese of one hundred and twenty pounds weight daily, and that I put into each cheese six pounds and a quarter of Salt, four-fifths of it in the vat, and one-fifth part upon the cheese, when taken from under the press, and put into the salting turnel and upon the drying benches. And I do hereby also make oath, that much of the Salt used in the vat is pressed out in the process of making the cheese under hand, and whilst under the press, and strong brine exudes from it afterwards, whilst in the turnel, and most of the Salt put upon the top of the cheese in the turnel, and on the benches, melts, runs upon the floor, and is lost; and that the brine which comes out of the cheese is of little use to the farmer. And I do further make oath, that the salt put into the cheese does not, to the best of my knowledge and belief, add to the weight of it; but if the whey and oily matters were not pressed out by the help of the Salt,* but suffered to remain in the cheese, they would materially injure its quality. SAMUEL WOOLF.

Sworn at Dorfold, in the county of Chester, April 11, 1818,
Before me, EDWARD TOMKINSON,
One of his majesty's justices of the peace for the said county."

April 14th, 1818.

78. *Mr. William Johnson called in and examined.*

You are concerned in a Salt manufactory at Malden in Essex? Yes, under the firm of Johnson, Tuck, and Bridges.

Have you had any application for Rock Salt for agricultural purposes?—Not one.

To what do you attribute that?—To the bonds and restrictions and securities required, and the penalties.†

* From the enquiries which I have been able to make, it appears to me that salt is of use in a dairy, by acting as a vehicle to carry off the whey from the new cheese, and that if the farmer could use salt without stint, the cheese would in general be more sound and better flavoured.—S. P.

† These bonds, restrictions, and securities, have not been required since the passing of the late act of parliament.

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Have you any reason to think, that if those restrictions and embarrassments were done away with, the farmers in your neighbourhood would use Salt for manure and for cattle?—I have no doubt they would come in great numbers for it for manure; and it would be the interest of the manufacturer to promote it as much as he could: we should be induced to let them have it as cheap as possible; and experiments on a small scale, in every field, would be made so conveniently and so cheaply, that there is not a farmer that would hesitate to come for it when the tax was removed.

What induces you to think they would come for it as a manure: have you ever seen any experiments?—No; but the general opinion in favour of it, and the experiments that have been made; and it then being in their power to adopt the trial of it at little charge, no man of common sense would hesitate to make trial of it.

79. *Mr. James Manley* called in and examined.

You are a farmer residing at Anderton in Cheshire?—I am.

Have you resided in the county of Cheshire, in the neighbourhood of the Salt Works, for a considerable time?—For thirty-five years.

You at one time overlooked some Salt Works?—Yes, the works of Swinton, Blase, and Co.

Are you aware of the use of Salt in agriculture, and have you tried any experiments with respect to its use?—I have tried it in my own garden upon onion land.

Is it very serviceable?—Yes: we use it every year if we can get it.

Have you tried it upon potatoes?—We have a man who lives on the bank who has tried it. He puts four or five cwt. of refuse salt upon his land.

How much land has he?—Ten Cheshire roods, equal to twenty statute roods.

Have you ever tried the use of Salt in marling ground, by using brine instead of water in getting marl?—Yes: I have a marl field of eight statute acres: in one part of the field marl was got with brine, and in another part of the field it was got with water.

Can you state the difference of the land you marled with brine and that which you marled with water?—It (the crop) was as much as five bushels to a statute acre more in that produced by brine than that produced by water.

What was this crop?—Wheat.

Have you any knowledge of the Salt leys, where they use the brine to irrigate the fields to force the grass?—I know Nantwich ley, where they do that, and have known it forty years.

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Is not that floated by a forcing pump, throwing the brine over the ground?—Yes, every autumn.

Is the pasture upon that ley looked upon as particularly good?—Yes.

Are not horses and other cattle very often sent to run upon that ley?—Yes.

And is not the price of the ley much higher than on other land?—It is double.

For what reason do you conclude that the value of the ley has increased?—It is called the Salt ley, by using the brine to it; and they send their cattle there to run, and horses that are lame or ill: they send them to it as to an hospital to physic them.

Can you speak to the use of Salt with sheep or cattle?—I know a farmer of the name of Sutton who uses it for his sheep and an old favourite horse.

Have you understood his flock have been better since he has used Salt, and have they been freer from the rot?—Yes; he told me last week he attributed it to Salt only that has saved them from the rot.

How long has he used it?—Three or four years.

Do you know its use in hay that has been damaged, to make it a palatable food to animals?—Mr. Marshall of Northwich buys ten bushels every year to put into his hay.

Whether damaged or not?—Yes, he has done it for years.

Have you observed the cattle passing the brine pits disposed to stop and drink it?—Yes.

Do you know of horses having often been taken to drink it when they have been out of order?—I have known it given to them.

At the brine pits?—Yes; but they will not permit them to take it from the pits. The farmers very frequently come to the works with a horse that has a strain to bathe him with hot brine from the pan; but they are not allowed to take it off the bank: they must bring them to the works.

You state that you got five bushels more of wheat upon an acre from your field that had been cultivated with Salt and marl than you did when it was manured with marl and water?—Yes.

Was there no difference in the season, that accounted for that difference in the produce; was not one season much better than another?—It was in the same season, on the same field; one half was marled with brine, and the other with water.

You stated, a friend of your's had for some years employed Salt for sheep?—Yes.

And he found it very advantageous to do so?—Yes.

And that for a number of years?—Three or four years.

And that under the present duties?—Yes.

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April 21st, 1818

80. The Right Honourable Sir *John Sinclair*, Bart. called in and examined.

Have you considered any of the advantages that are likely to arise to agriculture, in case of the repeal or modification of the Salt laws?—Yes; I have had frequent opportunities to investigate the subject, and occasionally to make some enquiries both at home and abroad; and I am fully convinced, that in many respects, Salt might be made of material service to agriculture; and if it is the wish of the committee, I will shortly state my views of the subject. It is a general principle that Salt in itself, applied in large quantities, is rather hostile to vegetation: it has a tendency, like every other excessive stimulus, to disorganize and destroy the vegetable substances with which it comes in contact; but in moderate quantities it promotes the growth of vegetables, by enabling them to take up more nutriment in a given space of time, and to perform their circulations and secretions with greater energy. Without referring to a number of curious and important facts in the Cheshire and other reports, I shall state one circumstance, transmitted to me some years ago by Mr. Sinclair, a farmer, in Cornwall, and lately confirmed to me by the Rev. Robert Hoblin, who possesses considerable property in the neighbourhood of the pilchard fisheries in Cornwall, and I believe he is concerned in some of the pilchard fisheries there. Mr. Hoblin, in that communication, states to me, that in those parts of Cornwall where the pilchard fisheries prevail, considerable quantities of old or condemned Salt are used as a manure mixed in compost with earth, broken fish, sea sand, and other substances: the quantity of Salt allotted to an acre mixed thus in compost is about a ton, which he states may cost about ten shillings; the broken fish is considered by him to be the most valuable article, but the Salt has acted friendly to vegetation in cases where it is thus used in a mild and modified form.

Have you seen, and can you state the results of any experiments made in the feeding of cattle, from your own observation?—I was at the farm once of a great farmer in the Netherlands, a Mr. Moselman, at Chinoi, near Wavre, where I was surprised to see an immense heap of Cheshire Rock Salt, which he said he found of the greatest use for his stock: he said, first, that by allowing his sheep to lick it, the rot was effectually prevented; secondly, that his cattle, to whom he gave lumps of it to lick, were thereby protected from infectious disorders; and the cows being thus rendered more healthy, and being induced to take a greater quantity of liquid, gave more milk; and I saw lumps of this Salt to which his cows had access in the place where they were kept: he also said a small quantity very bene-

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ficial to the horses when new oats were given them, if the oats were at all moist.*

With respect to steeping corn to prevent the smut, have you ever seen experiments on that subject?—Yes; in East Lothian, the favourite practice, as a preservative of seed-wheat against the smut, is to immerse it in water, so impregnated with saline particles that the wheat will float in it, which being frequently stirred, all the unsoued grains will rise to the top, which are then skimmed off: after the wheat is separated from the pickle it is spread on the floor, and a sufficient quantity of new slacked lime to dry the whole is sifted upon it.

Can you state what is the quantity of Salt that would be necessary to steep a certain quantity of corn?—I cannot say exactly: one of the most important uses of Salt, as connected with agriculture, is, that it preserves seed when sown from the attacks of the grub: this has long been the practice in some of the western districts of Scotland; and from the great destruction the crops of oats received from the grub, it has lately been revived. Observing an account of it in a Scotch newspaper, I wrote to the Earl of Hopetown, the lord-lieutenant of West Lothian, in whose district the practice had been tried, to know the effect; and he sent me a letter the other day, from which it appears that it has been attended with great success, and that in the cold districts in the west of Scotland its effects are considered to be so very great that few of the farmers have omitted it this season.

Do you believe, that by the use of Salt the food of animals could be made to go twice as far as it does at present?—I am of opinion that much coarser food might be used by animals with the aid of Salt, and, consequently, that cattle and other animals might be maintained at much less expense.

Do you expect the use of Salt ever to become general among the farmers of the country, but in consequence of the result of the experiments made by the great landholders?—I should think it would be a strong inducement in many parts of the country, having the experiments of the great landholders previously tried; but I know in many parts of the country, where the farmers of themselves, if every obstacle were removed, would try such experiments; and I received the other day a letter from Mr. Robert Brown, of Merkle, who is one of the first farmers in Scotland,

* Since the last edition of this pamphlet was published, a gentleman has informed me, from his own experience, that the quantity of Salt to be given to animals ought to be varied according to circumstances. For example, when horses are fed upon old oats, and old hay, three ounces of Salt per day will be sufficient, and may be given regularly with advantage; but where horses or cattle are kept upon moist food, such as new hay, grains, potatoes, or fresh oats, they will require double this quantity, or more, per day. The same person informs me also, that with respect to horses, he has thought it most advantageous to lay a large lump of Rock Salt in the field or the stable, and allow them to lick it as they have occasion.—S. P.

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who strongly presses the idea of the reduction of the duty, for the purposes of enabling the farmer to carry on his agricultural experiments.

Do you know at all the value or extent of the farm held by that gentleman?—Between three and four hundred acres. I would also mention one other thing, which is the benefit of Salt to oily seeds. It was first discovered in America, in the culture of flax, and has since been ascertained in this country by the experiments of Mr. Lee, of Old Ford, near Bow, in Middlesex, who tried it at my desire. The quantity of Salt should be the same as that of the seed sown, namely, about three bushels per English acre: it should be strewed upon the surface after the seed has been sown: it improves greatly the quantity and quality of the flax, and in particular the quantity of the seed from the new crop; it is thence conjectured it would be of use in other seeds of an oily nature.

Are you acquainted with the experiments made by Lord Somerville in mixing Salt in feeding his sheep?—I have read it, but never was present at any of the experiments.

Have you any doubt that Salt would be highly beneficial to the feeding of all kinds of stock, sheep, cattle, and horses?—It is imposible to doubt it. I find from a communication transmitted to me from Sweden, by Baron Schultz, that the Salt destroys the different kinds of worms which are found in the bodies of sheep, but in particular the liver-worm.

Would half-a-dozen well-attested experiments, proving the advantage of Salt, be sufficient to induce a very general concurrence in the same practice in farming?—I have no doubt that the minds of the farmers, and their dispositions to receive information, have been very much increased and improved by the discussions that have been going forward for these many years past, and that a few successful experiments, a knowledge of which was generally spread, and some expense incurred in making them known, and perhaps attended with some premiums to those who tried them, would soon spread any beneficial practice very generally throughout the country.

Do you suppose that the use of Salt would increase the disposition to fatten, and to milk in cattle?—I have not the least doubt of it: I have the authority of Mr. Moselman in particular, who is one of the most intelligent farmers I have met with, and who gave it to his cows for the purpose.

Have you ever seen any experiments made with Salt on damaged hay, by strewing it upon it in the stack?—I have never seen any experiments myself; but in some of the best authenticated reports to the Board of Agriculture, (that of the North Riding of Yorkshire, and that of Derbyshire) it is stated as a practice not unusual, and attended with great advantage, particularly when applied to the second crop of clover, which very often experiences bad weather.

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Do you not think that a great deal of fodder, which would be fit for nothing but the dunghill, could be made extremely good and nutritious food for cattle by mixing Salt in the stack?—I have no doubt, that by mixing Salt or brine with food that the stock would otherwise refuse, that it might be made extremely acceptable and nutritious."

Twenty-ninth of April, 1818.

81. *Mr. Bryan Shaw Hilditch* called in, and examined.

Where do you reside?—At Pretston, near Sandbatch, in Cheshire.

What is your business?—A farmer.

Have you tried several experiments on your farm, in the use of Salt as a manure?—I have.

Be so good as to state what those experiments were, and the result of them?—I have tried it twice only; once about seven years ago, as near as I can recollect. I procured five cart loads of refuse Salt, mixed with ashes: I spread it upon a piece of land which I had in summer fallow, intended to be sown with wheat, and I had it sown accordingly, the result of which was a very middling crop. I suppose that was upon about an acre and a half to two statute acres. This produced me, as far as I can recollect, about from eighteen to twenty Winchester bushels to an acre: from the expense of a summer fallow it ought to have produced from twenty-five to thirty, considering the kind of land.

If it had had a coat of dung upon it in the ordinary course, you mean to say?—Yes, or manured with a coat of lime.

Have you not used it also for turnips?—In consequence of this not succeeding to my wish or expectation, I never used it again, till last year I was induced to attempt it again, in consequence of what I heard spoken of, that government was going to take part of the duties off, to enable it to be used as a manure.

State the particulars of the last experiment?—It was land that was going for turnips, and I procured one load of this refuse Salt as good as I dare take, for I was apprehensive of the exciseman: it was better than I had before, and I had it spread upon what I judged to be a quarter of an acre, statute measure, about two months, or it might be three months, previous to sowing the turnips, for I was apprehensive it would entirely destroy the seed, to give it time to mix with the soil: this I caused to be sown with yellow Swede turnip seed, and the common white turnip seed: the Swede turnip produced almost next to nothing: they were very small, very little larger than potatoes; the white turnip seed was a great deal better, though I ought to have stated, that in the same field I had about three acres sown in the

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common drill way with manure which is generally used for turnips, and the crop was a fair average crop, both of the Swede and the white: the white turnip seed, which was sown on the salted land, though considerably better than the Swede upon the same land, was considerably inferior to the crop grown from common manure. This is the result of the two experiments I have made.

In the first experiment you tried yourself, namely, that of wheat, was it a whole close of ground you manured with Salt? —No.

Was there wheat in the other part?—Yes.

With what was the other part manured?—I believe* the other part with common manure.

Can you recollect what the produce of the other part was per acre?—It was considerably better; it might be six or seven bushels better by the acre: it was not good wheat soil: it was light, and we do not consider that so good.

The whole of the close was soil of the same description?—Yes.

Was the crop of turnips at all eaten by the fly?—It was not; that is the advantage I observed.

The part which was manured with Salt did not suffer so much with the fly?—No.

Was the other part of the field that was not manured with Salt eaten by the fly.—It was attacked by the fly, but did not suffer much.

Was there any part of the field affected with the grub in either of the experiments?—I cannot speak to that, it is so long ago.

Seventh day of May, 1818.

82 *Sir Thomas Bernard, Bart.* again called in, and examined.

You have stated, that the poor would use a great deal more Salt if it was duty free: from what do you collect that?—I have heard it expressed by poor people, that if they could get

* Much having been said respecting this evidence, I think it necessary to remark that the experiments were made in so loose a manner, that nothing can be learnt from them. The experiment with the wheat, he says, was seven years ago, and he seems to have kept no account of the management or the results; and we are not even told how many bushels of real Salt were put upon an acre. All we learn is, that after a summer's fallow, he manured *part* of the field *he* BELIEVES with dung, and the other with Salt, and having sown both parts with wheat, he expresses his surprise that the Salt did not produce him so large a crop as the dung, though he acknowledges that the soil was light, and not fit for wheat. The same want of accuracy is observable in his account of the experiment with turnips, though he acknowledges that the crop upon the salted land was protected entirely from the fly, while those in the same field which were grown with manure were attacked by that insect; and yet he says it is so long ago that he cannot recollect whether any part of the field was eaten by the grub in either of the experiments. Had Mr. Hilditch dunged the whole of the land alike, and then had sown a part of it with Salt, and given the committee a statement of the differences observable in the respective crops, from a written account kept at the time, some judgment might have been formed as to the advantage or disadvantage of using the Salt; but as it is, it appears to me that these experiments decide nothing.—S. P.

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more Salt, they should be better, and more happy: this is confirmed to me by Dr. Paris, who has informed me that the disease in the interior of Cornwall arose principally from the want of Salt; and that disease was *worms*, which was almost universal in that country, and which he believes was from eating their potatoes and pilchards without a proper, or any proportion of Salt.

Do you found that opinion upon any other medical opinion but that of Dr. Paris?—I do not recollect any other; but there is a case now published in the Medical Journal, which seems to confirm that opinion, of a lady who was at the point of death from worms, and it appeared she had *never used or eaten any Salt;* and she has been, as I have been informed, almost entirely cured by the administering of Salt.* I have the particulars in my pocket if the committee wish to see them.

Are not worms a common complaint all over the country?—I am not a physician; but it is notorious they are very general among the children of the poor in the *interior* of Cornwall, but on the *coast* they have them not.

EXTRACTS FROM THE

REPORT

OF THE SELECT COMMITTEE APPOINTED TO TAKE INTO CONSIDERATION THE LAWS RELATING TO THE SALT DUTIES.

Ordered by the House of Commons to be printed June 1, 1818.

89. "The principal increase of demand for Salt which your committee can venture to look to in case of a considerable reduction of the duties, is in respect of sheep and cattle: the application of Salt for this very beneficial purpose is general in many parts of the world, and the circumstance of its not being used in England may principally be attributed to the excessive tax imposed on that article. The use of British Salt in the Netherlands, and in the United Provinces, has been long known; and in Spain and Portugal, also, its value is fully appreciated; it appears, therefore, not too much to presume, that what is frequently applied in other countries, at considerable expense of carriage, might be soon brought into general use by the more enlightened farmers in the United Kingdom. Should this happen, and the application of Salt to agricultural purposes become general in the United Kingdom, it might ultimately so extend the consumption of it, as to enable parliament, without any

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* See Appendix, No. 3.

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sacrifice of revenue, to make such a reduction in the duty as would destroy every temptation to fraud and evasion, remove every alleged grievance that is now ascribed to the Salt laws, and furnish the means of realizing every advantage to the different classes of the community, and the great interests of the nation, which are dependant on the use of Salt in the most unlimited extent."

Resolved,

"That it is the opinion of this committee, that the repeal of the Salt duties would be productive of the greatest and most important advantages to all descriptions of persons in this kingdom, and that the present state of the income and expenditure of the United Kingdom alone prevents your committee from instructing their chairman to move for leave to bring in a bill for such total repeal."

Resolved,

"That in many points of grievance which have been brought under the consideration of the committee, a reasonable relief may be afforded, without exposing the revenue to the danger of material loss."

Resolved,

"That as at the present period of the session it is not practicable to pass a detailed law, in reference to the points alluded to in the last resolution, your committee have confined their instructions to their chairman to the single point of furnishing Salt to agriculture with additional facility, but it is desirable that a bill should be brought forward in the ensuing session; and that in the mean time any relief that can safely be given by official regulation should be afforded, and that means should be adopted to render the administration of the Salt laws in Scotland in all respects similar to the administration of them in England."

Resolved,

"That it is the opinion of this committee, that the consideration of this subject should be resumed early in the next session of parliament." *June* 1, 1818.

DIRECTIONS OF THE LATE ACT OF PARLIAMENT FOR ENABLING FARMERS TO PROCURE SALT AT THE REDUCED PRICE.

84. Any farmer or other person requiring Rock Salt for any of the aforesaid purposes, must procure from the nearest excise officer a certificate that he is an occupier of land, or otherwise, as the case may be. This paper will authorize and enable him to receive the Salt, any part of which (if he be a farmer) he may

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transfer to another farmer by a permit, which the excise officer will furnish him with. The permission to buy Salt at the low duty, and to use it as above, is not clogged with bonds or affidavits, as these are entirely done away with by the late act of parliament.

Any proprietor of Rock Salt, at Northwich in Cheshire, will furnish the Salt when applied to; but it may be obtained more quickly from one of the public depôts, a list of which is annexed. On inquiry, I find that Messrs. Horne and Stackhouse, respectable merchants of Liverpool, keep a depôt of Rock Salt, and are willing to forward any quantity to farmers, on the receipt of the excise certificate, at the rate of six pounds per ton, duty included.

In general, the best and cheapest way of obtaining the Salt from Liverpool is by sea. The following is the most correct and comprehensive list of the freights that I have been able to obtain. The rates by canal are not given, because I find they are often arbitrary, and depend much upon circumstances; besides, express terms may be made with the carriers, for the benefit of the purchasers.

A LIST OF THE EXPENCES OF CONVEYING ROCK SALT BY SEA FROM LIVERPOOL TO VARIOUS PARTS OF THE KINGDOM.

	about
To the Western Coast of Scotland.....	15*s.* per ton.
To the Eastern Coast of ditto	1 8*s.*
TO THE PORTS OF	
Cumberland.....	13*s.*
Lancashire.....	12*s.*
North Wales.....	12*s.*
Somerset, Devon, and Cornwall.....	14*s.*
Dorset, Hants, Sussex, and Kent.....	16*s.*
Essex, Suffolk, and Norfolk.....	18*s.*
Lincoln, York, Durham, and Northumberland.	20*s.*
Port of London.....	18*s.*

The rates of freight here mentioned apply to *cargoes* of Salt, or to quantities of twenty tons or upwards. For a few tons, the freight will generally be 2*s.* to 3*s.* per ton more; to which will be added the port dues, wharfage, &c. and which vary in different ports from 5*s.* to 10*s.* or 15*s.* per ton.

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NAMES OF SOME PEOPLE WHO ARE AUTHORIZED TO KEEP DEPÔTS OF ROCK SALT FOR SALE.

85. Mr. Frederic Andrews, Sun Street, Bishopsgate Street, *London.*
Messrs. Horne and Stackhouse, Salt Merchants, *Liverpool.*
Mr. R. Fuge, No. 19, Queen Square, ... *Bristol.*
Mr. Culley . . . . . *Norwich.*
Mr. John Fordham of Odsey, near Royston, . . *Hants.* Herts

All the information which I have been enabled to obtain respecting these depôts, is, that Mr. Andrews of London, and Mr. Fordham of Odsey, have mills for grinding the Rock Salt, and reducing it to fine powder; and that when thus prepared they mix it with coal tar, in the proportion of one pound of tar to one hundred and twelve pounds of Salt, as directed by the act. In this state it is sold by Mr. Andrews at nine pounds per ton, or in smaller quantities at nine shillings and sixpence per cwt. When sold *in lumps* the price in London is eight pounds per ton.

Messrs. Horne and Stackhouse, in consequence of their vicinity to Northwich, are enabled to sell lumps at six pounds per ton duty paid. The prices at which it is sold by the other persons mentioned above I am not acquainted with.

PREMIUMS OFFERED BY THE HONOURABLE BOARD OF AGRICULTURE FOR EXPERIMENTS WITH SALT, 1818-19.

Salt, as Food.

86. To the person who shall make, and report to the board, the most satisfactory experiments on the application of Salt, for assisting in feeding or fattening the live stock of a farm—the gold medal, or fifty pounds.

Accounts, verified by certificates, specifying the number and quality of the stock fed, with the quantity of Salt consumed by the same,* to be produced on or before the 1st of March, 1820.

* A curious fact has lately come to my knowledge, which I cannot resist publishing. A gentleman, who keeps sixteen farming horses, made the following experiment with seven of them, which had been accustomed to take Salt with their food. Lumps of Rock Salt were laid in the mangers; and these lumps, previously weighed, were examined weekly, to ascertain what quantity had been consumed; and it was repeatedly found that whenever these horses were fed with old hay and corn, they consumed only from two and a half to three ounces, but that when they were fed with *new* hay they took six ounces per day. I have learnt also that horses which are fed with moist grains require seven or eight ounces of Salt per day.—S. P.

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Salt, as Manure.

To the person who shall make, and report to the board, the most satisfactory experiments, to ascertain the advantages or disadvantages which have attended the use of Salt as a manure, either simple, or mixed with other substances—the gold medal, or fifty pounds.

Accounts, verified by certificates, specifying the nature of the soil on which the experiments are made, with the quantity of the Salt, and the time of its application, the effect on the crop cultivated, to be produced on or before the 1st of March, 1820.

It is to be hoped that these premiums will excite a laudable spirit among enterprising farmers, to ascertain particulars of such importance to the agricultural interest.

PREMIUMS

OFFERED BY THE HIGHLAND SOCIETY OF SCOTLAND FOR EXPERIMENTS WITH SALT.

Highland Society Chambers,
Edinburgh, 19th August, 1818.

87. The duty on Rock Salt, to be applied to purposes of agriculture, having been reduced, by an Act passed in last session of parliament, to two shillings and sixpence per bushel, or five pounds per ton, the following premiums are offered by the Highland Society of Scotland for experiments with Salt.

1. To the person in Scotland who shall make and report to the society the best and most satisfactory experiments on the effects of Salt as a manure in general—a piece of plate of thirty guineas value, or that sum in money.

2. To the person in Scotland who shall make and report to the society the best and most satisfactory experiments on the effect of Salt in feeding and fattening live stock—a piece of plate of thirty guineas value, or that sum in money.

It is required that the extent of land to be treated with Salt shall not be less than five English acres, and that the number of live stock, in the feeding of which Salt is used, shall not be fewer than five black cattle and twenty sheep. The respective reports must distinctly specify the nature of the experiments, and how often repeated, the quantity and proportion of Salt employed, and any other circumstances connected with the subject, which may be considered material. The reports to be lodged with the deputy secretary on or before the tenth of November, 1820, accompanied by certificates by two members of the society, or by one member and a justice of the peace, in support of the several matters therein detailed.

By order of the directors,

LEWIS GORDON, Dep. Sec.

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88. A COMPLETE LIST

OF THE

AGRICULTURAL SOCIETIES IN ENGLAND AND WALES.

Name of the Society.	Secretaries.	Address.
Abbey Holme,		Abbey Holme. Cumberland.
Anglesey,	Mr. H. Jones,	Llangefrie.
Bath and West of England,	Hetling House,	Bath.
Barnard Castle,		Barnard Castle, Durham.
Bawtry,		Bawtry, West Riding, Yorkshire.
Bedfordshire,	Mr. Times, Solicitor,	Bedford.
Berkshire,		East Ilsley, Berks.
Board of Agriculture,	A. Young, Esq.	No. 32, Sackville St. Piccadilly, London.
Border Agr. Society,	Mr. Geo. Jordan,	Kelso.
Boston,	Chas. Tunnard, Esq.	Frampton near Boston.
Bramber,	Mr. Stedman,	Horsham.
Brecknockshire,	Mr. Edwards,	Old Red Lion, Brecon.
Cambridgeshire,	Mr. A Chevell,	Cambridge.
Cardiganshire,	Mr. J. Bowen,	Lechryd near Cardigan.
Carlisle,	Mr. John Studholme,	Address not known.
Carmarthenshire,		Carmarthen.
Carnarvonshire,	Address the Secretary	For the Anglesey.
Christ Church,	Mr. James Angier,	Christ Church, Hants.
Cleveland,		Guisborough, Yorks.
Cornwall,	John Wallis, Esq.	Bodmin.
Craven,		Skipton, Yorkshire.
Derbyshire,	Mr. Jos. Webster,	King's Head, Derby.
Devon, (South)		Totness, Devon.
Doncaster,		Doncaster, Yorkshire.
Dorsetshire,	Mr. Thomas Coombs,	Dorchester.
Drayton, Shropshire,	Mr. Thomas Duken,	Peatswood, near Market Drayton.
Durham,		Darlington, Durham.
Essex,		Chelmsford.
Farmer's Club,		Thatched House, St. James Str. London.
Fenwick,		Fenwick, Durham.
Garstang,	Mr. Thomas Bell,	Garstang.
Glamorgan,	Edward Bradley,	Cowbridge.
Hackness, East Riding, Yorkshire,	Mr. Allison,	Grime.

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Hampshire,	M. Dutny, Esq.	Ripley House, Abresford.
Hayfield,		Hayfield, Derbyshire.
Hertfordshire,	Thos. Nicholson, Esq.	Hertford.
Herefordshire,	Mr. J. Dunscumb,	Hereford.
Holderness,	Mr. James Iveson,	Heden, Yorkshire.
Howden,		Howden, Yorkshire.
Holkham,		Holkham, Norfolk.
Kendall,		Kendall, Westmoreld.
Kent,	Mr. Partridge,	New Road Canterbury
Kent Association,		Ashford, Kent.
Kimbolton,	William Day, Esq.	St. Neots, Huntingdon.
Kinlet,	Mr. Childe,	Kinlet.
Lamport,		Lamport, Northamptonshire.
Lancaster,	Mr. Jon. Binns,	Leach House, near Lancaster.
Leicester and Rutland,		Leicester & Oakham.
Luneside,	Thomas Fawcett, Esq. for the Secretary.	Sedberg.
Malford,		Clare, in Suffolk.
Manchester,	Mr. John Ashworth,	Turton, near Bolton-le-Moors.
Merino Society,		Freemasons' Tavern, London.
Merionethshire,		Edernion, N. Wales.
Newark,	G. Hodgkinson, Esq.	Southwell.
Norfolk,	Rev. St. John Priest,	Near Dereham.
Newcastle-on-Tyne,		Newcastle, Northumb.
Newcastle Cattle Society,		Newcastle, Northumberland
Newcastle and Pottery,		Newcastle, Staffordshire
Northamptonshire,	C Hillyard, Esq.	Northampton.
North Devon,	Rev. John Torr,	Westleigh Vicarage.
North Lonsdale,		Lonsdale, Lancashire.
Oxfordshire,		Woodstock, Oxon.
Oswestry,	Rev. W. Bourke,	St. Martin's, Oswestry
Pembrokeshire,	Mr. J. Phillips,	Haverfordwest.
Peterborough,		Peterborough.
Peylyn and Edernion,	Rice Pryce, Esq.	Rhiewlas, Bala, N.W.
Penwith,	Mr. J. Trimenhere,	Penzance.
Petersfield,	Mr. John Lipscomb,	Weston, nr. Petersfield
Preston,	Mr. John Fletcher,	Preston, Lancashire.
Radnorshire		Presteign, Radnor.
Repton Sheep Society,		Repton, Derbyshire.
Rushyford,		Rushyford, Durham.
Saltersbrook Shepherd Society,		Saltersbrook Inn, Yorkshire.
Seamer, Yorkshire,	Mr. Christr. Bourdas,	Seamer.
Shiffnall,	Mr. Harding,	Grindle, near Shiffnall.
Shropshire,	Mr. W. E. Jeffreys,	Shrewsbury.

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Shiney Row,		Shiney Row, Durham.
Smithfield Club,		Freemasons' Tavern.
Society of Arts, &c.	A. Aikin, Esq.	John Street, Adelphi.
Staffordshire,	Mr. T. G. Parr,	Lichfield.
Surrey,	Mr. Piper,	Dorking.
Sussex,	Mr. F. H. Gell,	Lewes.
Sutton,		Sutton in Ashfield.
Teeswater,	Mr. John Wood,	Kimblesworth, Durh.
Torrington, Devon,	Francis Kingdom, Esq.	Great Torrington.
Tweed-side,	Wm. Molle, Esq.	Mains, Durham.
Tyne-side,	Wm. Johnston, Esq.	Bywell, Northumb.
Wellingborough,		Wellingborough.
Whaley,		Whaley, Lancashire.
Whardale,	Mr. Wilkinson,	Otley, Yorkshire.
Whitby and Pickering,		Hackness, Yorkshire.
Wigton, or Wytown, Scotland.	Geo. M'Haffie, Esq.	Corse Malzie.
Wilts,	Mr. John Nicholson,	Barford, nr. Salisbury
Wirral and Western, Cheshire.		Cartlett Ferry House, Cheshire
Wolsingham,		Wolsingham, Durham.
Workington,	B. Thompson, Esq.	Workington, Cumb.
Worcestershire,	Mr. Best,	Kemsey, nr. Worcester
Wortley,		Penistone, Yorkshire.
Wrexham,	Mr. John Roberts,	Wrexham, Denbighs.
Wynnstay,	Sir W. W. Wynne.	
Wyvelscombe,		Wyvelscombe, Somert.
Yorkshire		York.
York, East Riding,		Driffield, Yorkshire.

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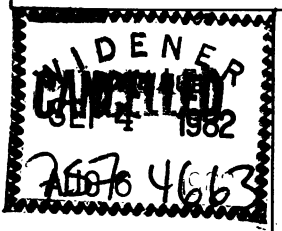
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